SEPTEMBER 1960

WIRE AND WIRE PRODUCTS

For clean-keeping,
snarl-free wire coiled
in drum, pack or pail—

Photo Courtesy TECHALLOY CO. INC., Rahns, Pa.

"Quick on the Draw!"

The Vaughn®

20 STRAND

MULTI-PAK UNIT

Many wire producers today find that protecting good wire in package or payoff drum pays excellent dividends in greater customer acceptance. Wire is kept clean and free of snarls, handling is easier, bright-labeled brand identification is unquestionably profitable.

To meet the demand, Vaughn-developed Multi-Pak Units serve a wide range of requirements smoothly and efficiently. Here is our 20-strand unit—typically Vaughn in well-engineered performance. Let us tell you about it, soon!

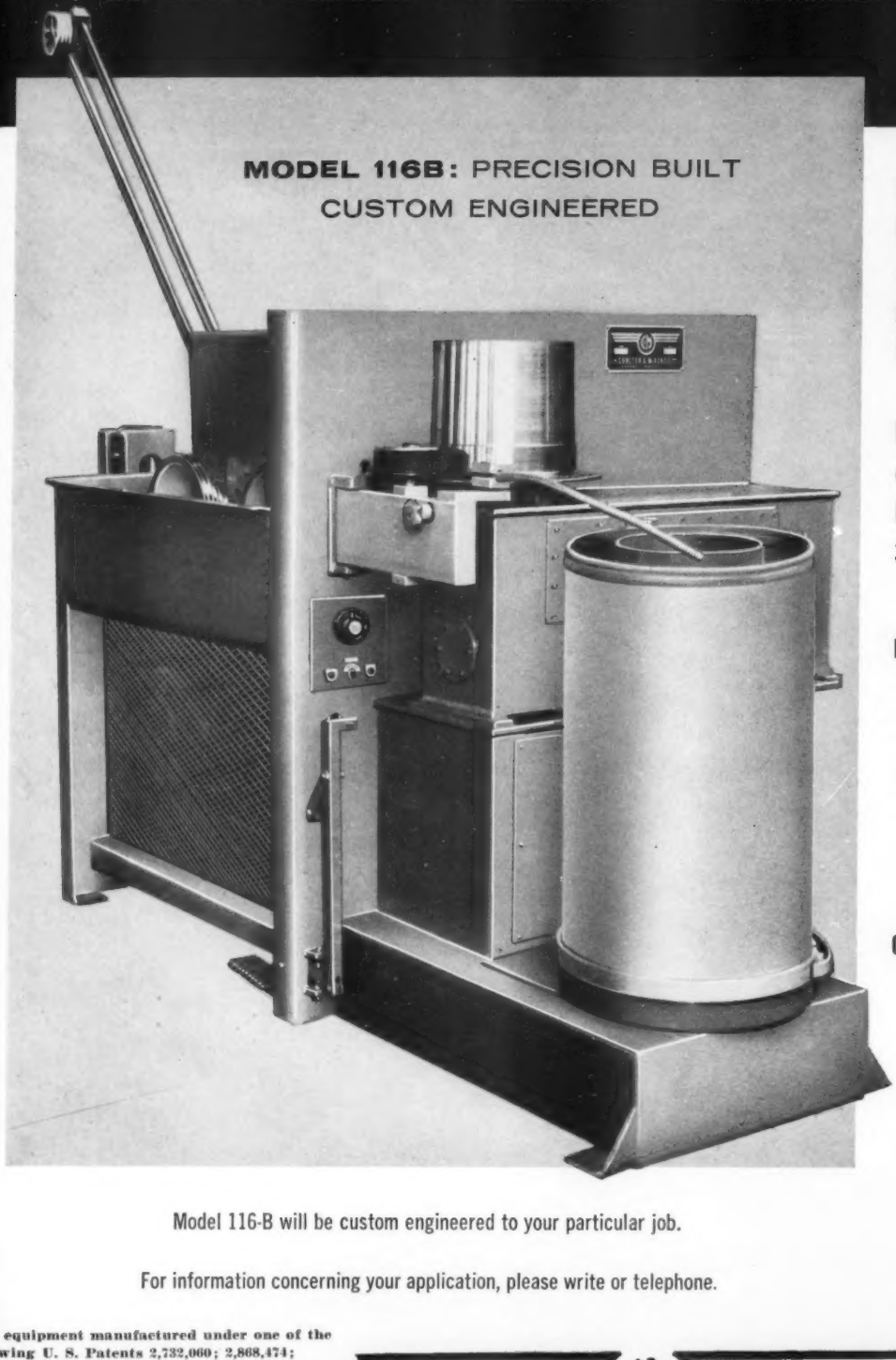
THE VAUGHN MACHINERY COMPANY
CUYAHOGA FALLS, OHIO, U. S. A.

OFFICIAL PUBLICATION OF THE WIRE ASSOCIATION

COULTER & McKENZIE

continuous

WIRE DRAWING & PACKAGING MACHINE



MODEL 116B: PRECISION BUILT
CUSTOM ENGINEERED

SUPER FAST BLOCK CHANGES — Push-button control interchanges 3 standard size draw blocks in seconds with **no gear or belt changes.** (8″, 10″ and 12″ blocks)

EXTRA VERSATILE PACKAGING — Accommodates coils, stems, and Draw-Pak containers. (20″ x 30″ or 23″ x 30″ drum)

IMPROVED DESIGN FEATURES:

1. Positive tangle switch
2. Fully enclosed
3. Liquid cooled
4. All steel welded construction
5. Electric clutch for "Soft Starting"

GREATER PRODUCTION CAPACITY

1. Continuous drawing and packaging of ferrous or non-ferrous wires
2. Wire sizes to .100″
3. Number of reductions — 3 to 12
4. Speeds to 1000 ft./min.

Model 116-B will be custom engineered to your particular job.

For information concerning your application, please write or telephone.

his equipment manufactured under one of the llowing U. S. Patents 2,732,060; 2,868,474; 44,416; 2,868,268 or others pending.

Barron & Crowther Ltd., Eastleigh, Hant England. European Draw-Pak Licensee Idos Industries Ltd., Royston, Herts, England, Sales Agents.

35 UNION AVENUE

TELEPHONE EDISON 5-1101
LIEBER'S CODE "MACKENZIE"

THE COULTER & McKENZIE MACHINE CO., INC.

SINCE 1843 BRIDGEPORT 7, CONNECTICUT, U. S. A. INCORPORATED 1881

Color Identification...

of

Wire Drawing Lubricants

Offers The Following Unique Advantages:

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FROM
STANDARD

SUPERVISORS HAVE ABSOLUTE CONTROL OVER LUBRICANT JOB APPLICATIONS.

MACHINE OPERATORS QUICKLY SELECT THE CORRECT LUBRICANT BY COLOR.

WIRE REJECTS, ATTRIBUTABLE TO THE USE OF INCORRECT LUBRICANTS, ARE ELIMINATED.

COLOR IDENTIFICATION SAVES DOLLARS AND TIME EVERYWHERE.

"Look to Standard for the Future"

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Telephones: 2131 - 2141

European Manufacturer:
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Gran Via No. 4, Bilboa, Spain.

Canadian Manufacturer:
H. L. Blachford Ltd., 977 Aqueduct St., Montreal, Que.
H. L. Blachford Ltd., 40 Titan Rd., Toronto, Ont.

Standard Industrial has pioneered in most of the outstanding contributions to better wire drawing through better lubricants. Consult Standard Industrial for the solution of your difficult problems.

how TEAMWORK PIONEERED the use of COLOR in PLASTIC JACKET CABLES

Lenz Electric Manufacturing Co. felt the need in the electronics industry for color in plastic jacketed cables.

In pioneering its development and use, Lenz Engineers called upon the Blane Corporation for a vinyl insulation material in various colors that would offer faster, easier, and permanent identification of cables before, during, and after installation.

Lenz specified that the material must facilitate connections between electronic units, make cables easier to locate and end forever confining cable jacket colors to the few dull and nondescript shades.

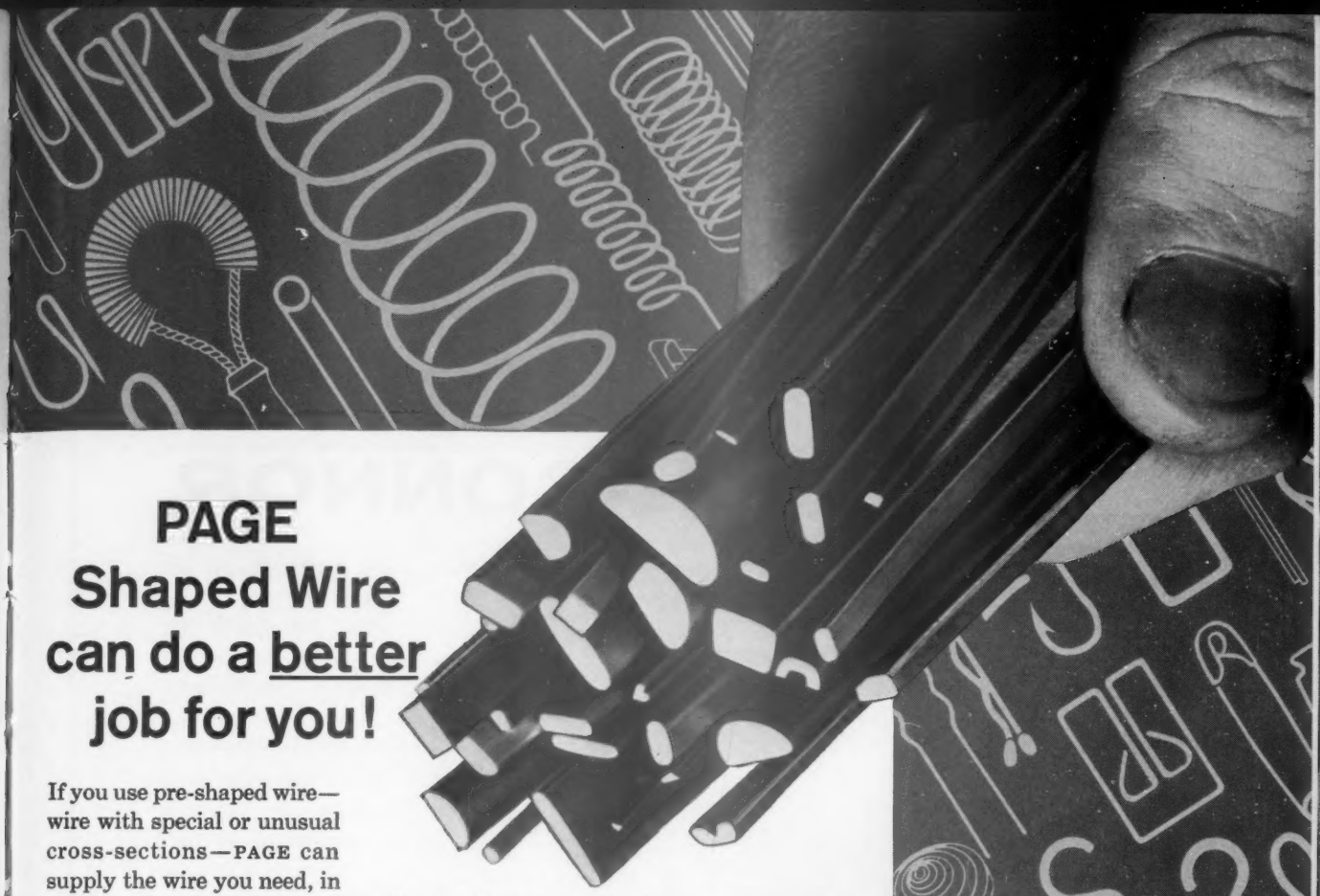
The result is Blane's custom colored jacketing compounds.

We salute Lenz for its initiative in this important program of raising the industry's standards by producing quality, practical and economical colored plastic jacketed cable.

Blane is proud of the part it has played in helping to introduce color for plastic cable applications.

THE BLANE CORPORATION
CANTON, MASSACHUSETTS

BLANE



PAGE Shaped Wire can do a better job for you!

If you use pre-shaped wire—wire with special or unusual cross-sections—PAGE can supply the wire you need, in a wide variety of steels, packaged the way that's best suited to your operations.

PAGE can furnish *any* shape, ranging from the simplest standard shapes to complex "specials." You can specify low carbon, high carbon, alloy or stainless steels, or Armco ingot iron. Strict specifications covering physical properties and size tolerances are no problem at PAGE, the leading special-purpose wire producer. PAGE also offers packaging tailored to your specific requirements.

Most important, you can count on PAGE accuracy and uniformity—regardless of your use of shaped wire.

SEND US A SAMPLE of the shaped wire you use now, with information as to analysis and your tonnage requirements. We'll be glad to recommend a **PAGE** shaped wire to help you reduce your costs or improve your products. For details on PAGE shaped wire, write us at Monessen, Pa., for **Booklet DH-1226**—or for information on the many other manufacturers wire items available from PAGE.

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Page Steel and Wire Division • American Chain & Cable Company, Inc.

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PAGE *—the source for answers to wire problems*

Get the

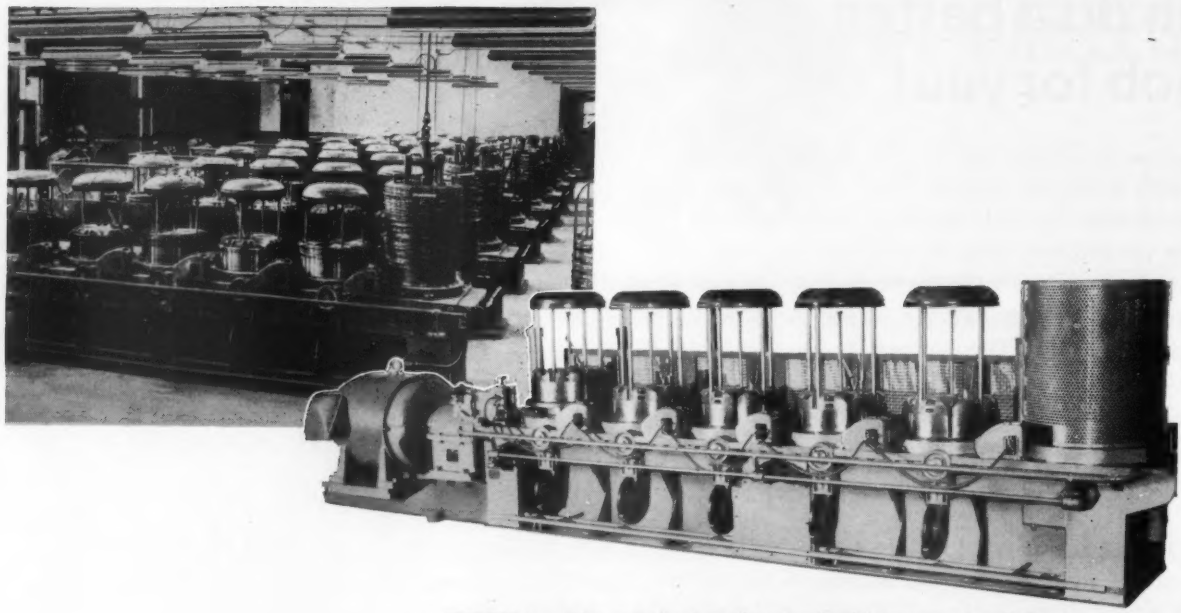
EXTRA

advantages of

IMPROVED

MORGAN-CONNOR

WIRE MACHINES



EXTRA—You get the benefit of valuable years of unfailing production-line performance—plus the latest improvements in every Morgan-Connor wire machine.

EXTRA—You get big, heavyweight bundles, with reduced down time and unloading time.

EXTRA—You get one motor—simplified drive and low power costs.

EXTRA—You get extra floor space because of compact design.

EXTRA—You get efficient, trouble-free performance from every machine. Write us for further information.

MORGAN CONSTRUCTION CO.

WM-11B

WORCESTER, MASSACHUSETTS, U. S. A.

ROLLING MILLS | MORGOIL BEARINGS • WIRE DRAWING MACHINES • COMBUSTION CONTROLS

WIRE AND WIRE PRODUCTS*

A monthly publication devoted to the production of Wire, Rod and Strip, Wire and Rod Products and Insulated Wire and Cable.

DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 35 September, 1960 No. 9

Designated as Official Publication By The Wire Association

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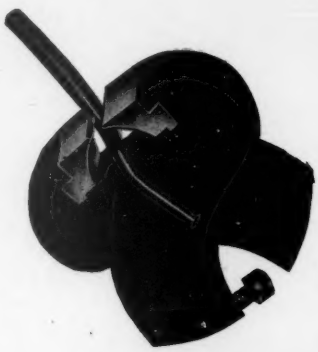
Workmen Appreciate Good Tools.

Tools that produce more for them — produce more for you.

Carew cutters have given consistent quality unequaled in 90 years.



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Jaws are of hardened tool steel and are replacable

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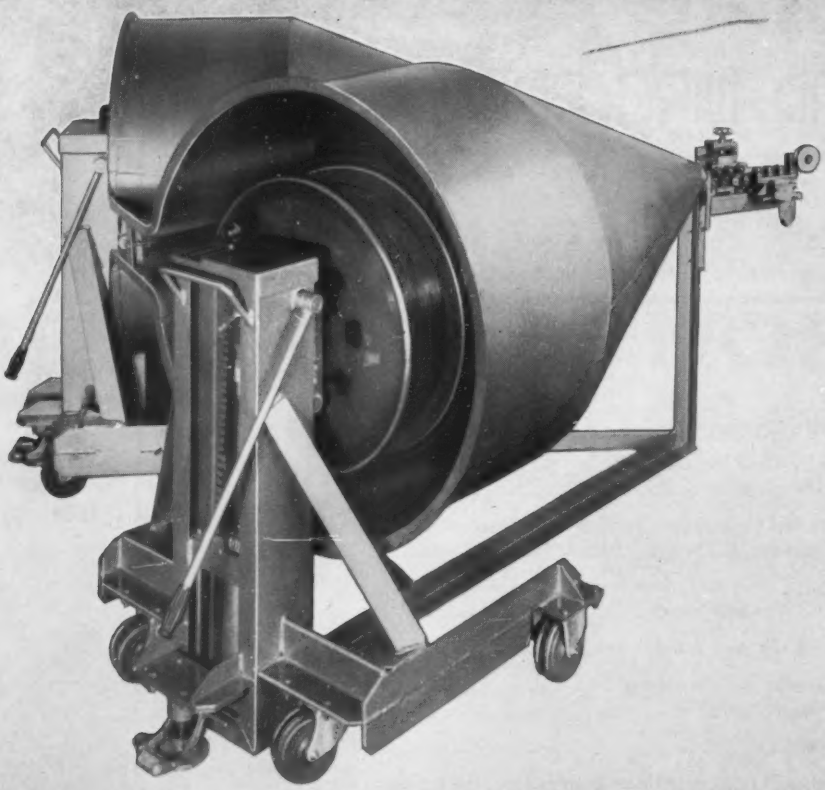
feel free to consult us about your wire cutting problems.

STEP UP YOUR EXTRUDER LINE CAPACITY



SIMPLIFY REEL HANDLING PROBLEMS WITH THIS ENTWISTLE HIGH SPEED UNIT.

Your extruder line operation will reach a new high in speed and efficiency with the Entwistle Dual Flyer Pay-Off. This unit enables continuous pay-off of wire at speeds in excess of 3500 FPM, reel weights up to 1500 lbs., and wire sizes down to No. 26 A.W.G.

Switch-over to the second reel is accomplished automatically through a polished steel opening in between the hoods. Braking of reels and all inertia problems are non-existent with this type of pay-off. Dual hydraulic reel trucks make loading and unloading of reels a much simpler operation.

Find out what the Entwistle Dual Flyer Pay-Off can do for your extruding operations. Write or phone for complete details.

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Manufacturing Corporation

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Over 40 years of dependable service to the Wire Industry

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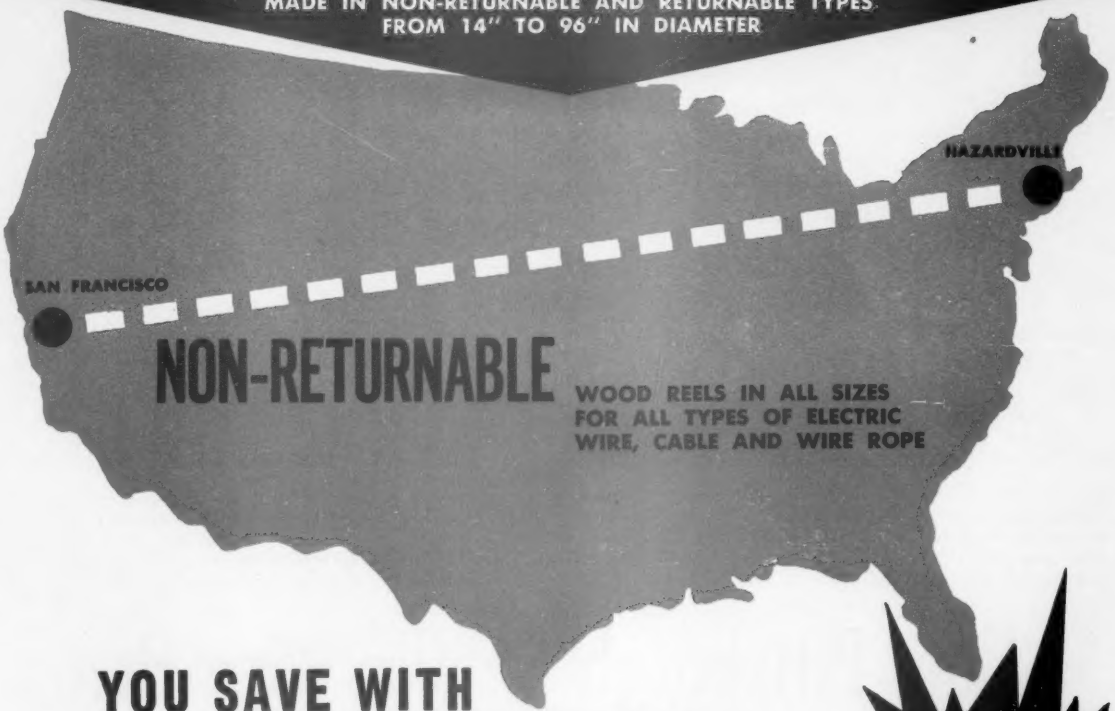
A BOARDWALK FROM HAZARDVILLE TO SAN FRANCISCO

The wood used in the manufacture of BRIDGE REELS, in one average year's production, would make a boardwalk one-inch thick and twelve inches wide stretching over 3,000 miles across the country — OR — it would provide enough lumber to build 3,000 six-room houses — THAT'S QUITE AN OPERATION! The important deduction, however, is that BRIDGE REELS for WIRE, WIRE ROPE and CABLE are good enough to meet the exacting demands of most of the big wire plants of the country.

MADE IN NON-RETURNABLE AND RETURNABLE TYPES FROM 14" TO 96" IN DIAMETER

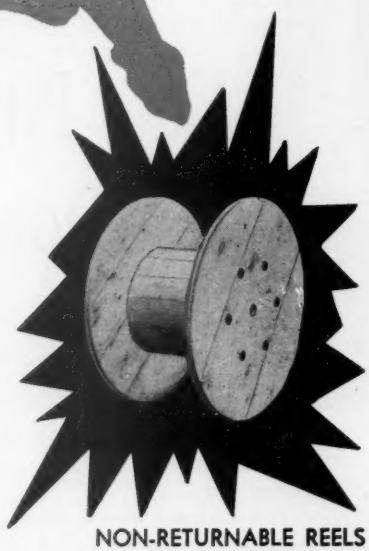


NON-RETURNABLE

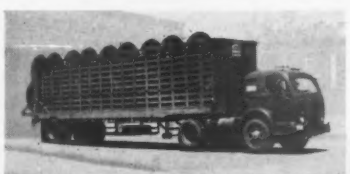
WOOD REELS IN ALL SIZES FOR ALL TYPES OF ELECTRIC WIRE, CABLE AND WIRE ROPE

YOU SAVE WITH NON-RETURNABLES

- Reduced Reel Investment
- Less Storage Space
- Lower Freight Costs
- No Repair Costs
- No Return Freight Charges
- No Bookkeeping
- No Deposits Needed
- No More Headaches!!



NON-RETURNABLE REELS GIVE YOU A DEFINITE PACKAGING COST.



HIGH SPEED

SHIPPING SERVICE IN OUR OWN TRUCKS

within a radius of 250 miles from the plant. Fast freight will bring you Bridge reels within a few days east of the Mississippi.

BRIDGE

MANUFACTURING COMPANY
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Riverview 9-8308

"REEL GOOD . . .

Let us quote on your reel needs. Send us your specifications. Better yet, visit our plant and see how and why Bridge reels are made so well at so low a cost.

WOOD REELS"

D. C. Forry, sales manager for Ridge Door, left, shows Pittsburgh Steel Salesman Robert Hogan how each spring is tagged, indicating pounds pull to assure that the proper weight garage door is matched with the proper springs.

Testing a 25-inch long extension spring to determine the pounds pull required to extend the spring to 67 inches. Engineering formulas tell workers what weight springs will balance each door. Correct pounds pull is marked on tag which is fastened to spring

How Pittsburgh Steel's Wire Helps A Door Man Keep His Balance

Ridge Door Company Uses Oil Tempered Spring Wire From Pittsburgh Steel Company To Coil Extension And Torsion Springs Which Balance Garage And Industrial Doors Within Five Pounds

It takes an even temper to make a garage door.

For Ridge Door Company of Monmouth Junction, N.J., "even temper" means dependable uniformity in oil-tempered spring wire it gets from Pittsburgh Steel Company.

Garage doors are deceiving. Doors identical in style and size can vary as much as 30 pounds in weight due to the wood's moisture content and other factors. Yet the springs which open and lower doors with mere finger-tip pressure must be in near perfect balance.

Uniformity of Pittsburgh Steel's oil-tempered spring wire enables Ridge Door, a division of Muskegon Motor Specialties Company, to match individual doors to springs whose pull is within five pounds of the door's weight. Here's that story:

The matching process begins with completion of the wooden door, made of high altitude, kiln-dried hemlock or Douglas fir. Each finished door is weighed carefully and tagged to show its weight.

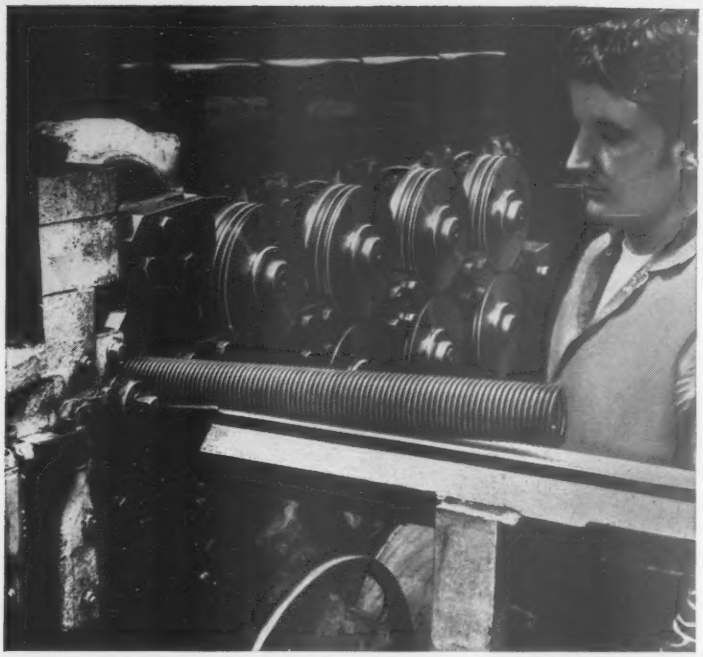
Meanwhile in the Spring Department springs are being coiled according to engineering formulas which take into account door weights, drum diameters and other factors. After coiling, each extension spring is tested to determine the number of pounds pull required by extending it a specified number of inches. This pull is machine stamped on a tag which is fastened to the tested spring.

For example, a 25-inch spring is extended to 67 inches and the pounds pull is automatically recorded.

Engineering formulas tell the workers what weight springs to match with different doors. As a result, Ridge Door is able to assure its customers that doors will be in balance within five pounds.

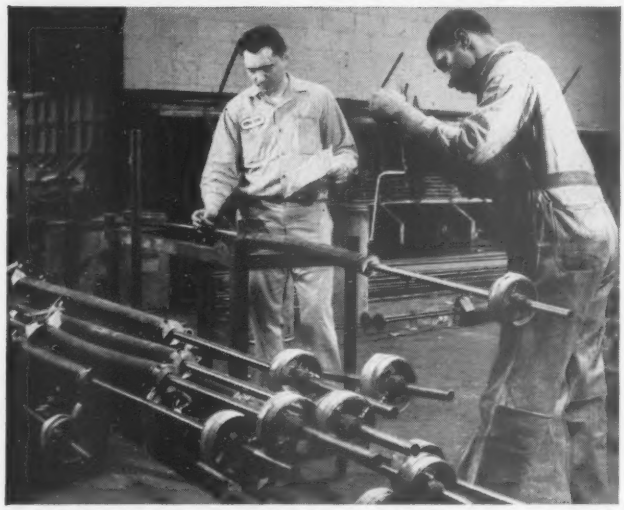
Uniformity of oil tempered spring wire makes this precision work possible. Springs coiled from Pittsburgh Steel wire can be depended on for consistent performance.

Coiling up to five tons of springs a day provides a tough test which

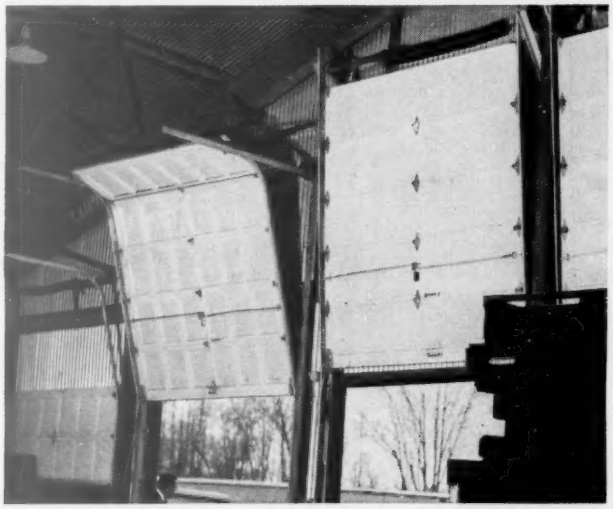


Uniform diameters and freedom from hard and soft spots speed spring coiling in the Monmouth Junction, N.J., plant of the Ridge Door Co. Division of Muskegon Motor Specialties Co. Pittsburgh Steel Co.'s oil tempered spring wire helps Ridge Door match springs to doors so precisely that finished product is in near perfect balance.

After coiling, springs are loaded into a two-unit, gas-fired furnace for heat treating. Springs are stress relieved for an average of 45 minutes at 475 degrees F. to achieve desired physical characteristics.



Assembling torsion springs on shaft. Each of these shafts will get two springs for use in raising a 16 by 7-foot double garage door. The springs shown here are coiled from wire .263 inch in diameter. The finished springs each have 120 coils. Drums and cables already are assembled.



A combination of high lift and vertical lift industrial doors produced with springs coiled from Pittsburgh Steel Co. wire is shown here. The installation is in the New Brunswick, N. J., warehouse of the Herman Forwarding Co.

Pittsburgh Steel wire passes.

Carmen Pellino, foreman of the Spring Department, puts it this way:

"We must have wire with uniform diameters, free from kinks as well as hard and soft spots.

"Variations in diameter prevent proper coiling since the wire will not pass through the rolls on the coiling machines properly. Soft and hard spots produce uneven coils and affect spring performance. We have found springs coiled from Pittsburgh Steel wire coil without trouble and perform well in service."

Other users of the wide range of wires for industry produced by Pittsburgh Steel get similar advantages. For improved production and greater customer satisfaction, call one of the district offices listed below. Real help is as close as your phone.

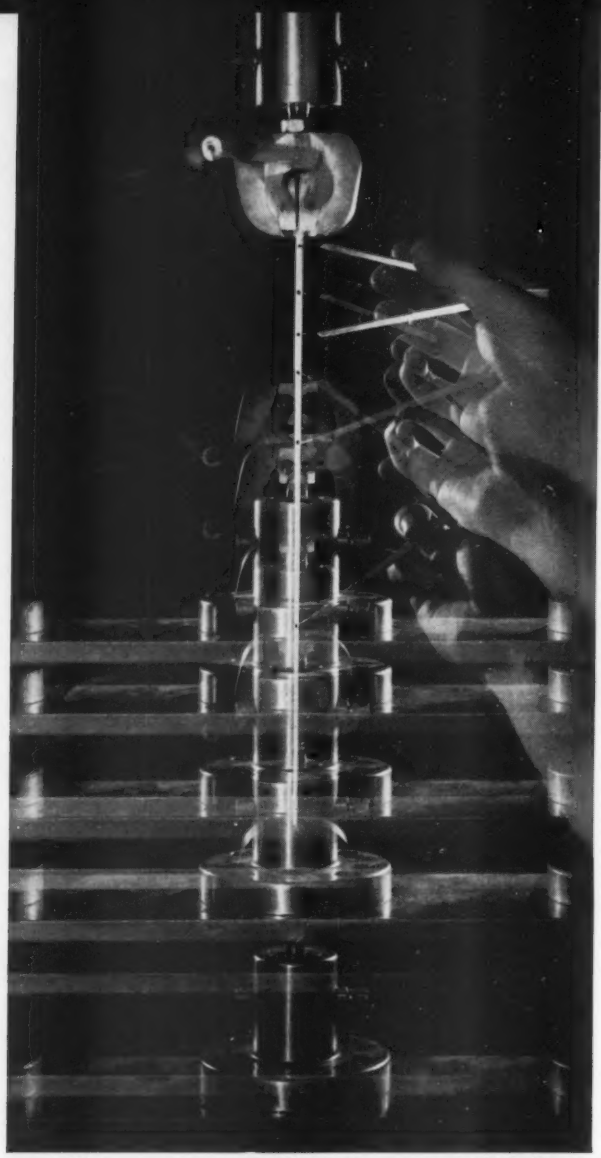
Pittsburgh Steel Company

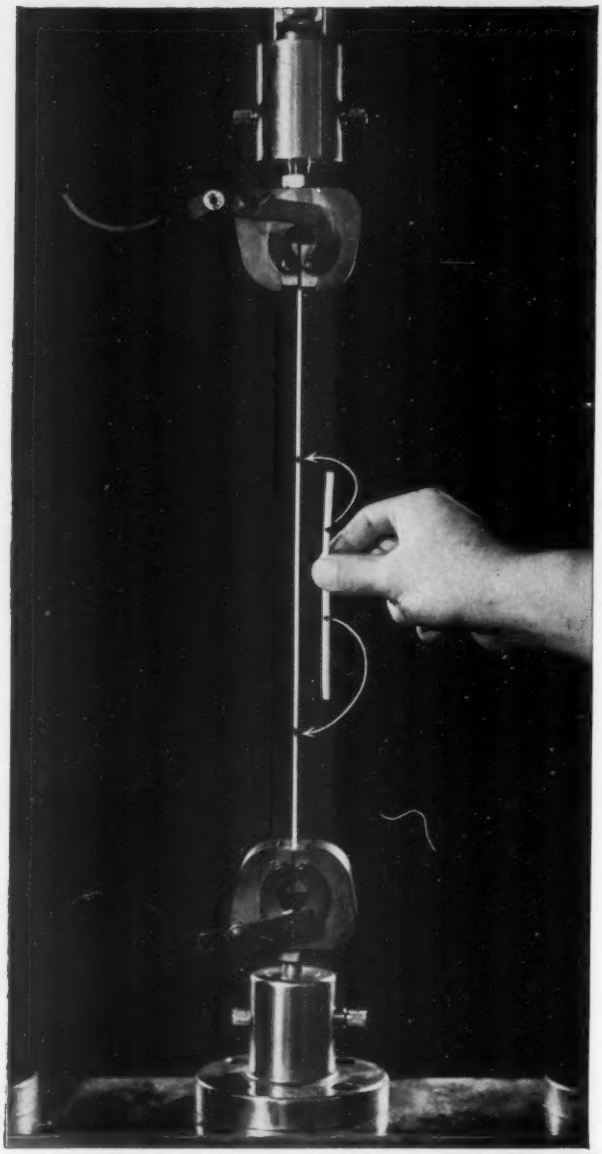
Grant Building • Pittsburgh 30, Pa.

DISTRICT SALES OFFICES

Atlanta	Cleveland	Detroit	Los Angeles	Pittsburgh
Chicago	Dayton	Houston	New York	Tulsa
			Philadelphia	Warren, Ohio

Steel





These photographs show Opalon 1040 insulation, after aging 7 days @ 121°C., being stretched over 2½ times—a retention of 92% elongation of unaged material!

After aging 7 days at 121°C., OPALON® 1040 vinyl insulation retains 92% elongation!

Opalon 1040—UL-approved compound for THW* insulation and jacketing—provides a wide margin of safety in passing UL specifications. These photographs graphically show how. In elongation and retention of elongation after aging—*the major areas where failure may occur*—new 1040 is outstanding.

With a fine balance of electrical and physical properties, and processing characteristics, Opalon 1040 is highly useful for insulation and jacketing for building wire, and jacketing for communication and distribution wire. Its excellent moisture-resistance produces jacketing and insulation that protects against conductor corrosion and oxidation under extreme moisture conditions.

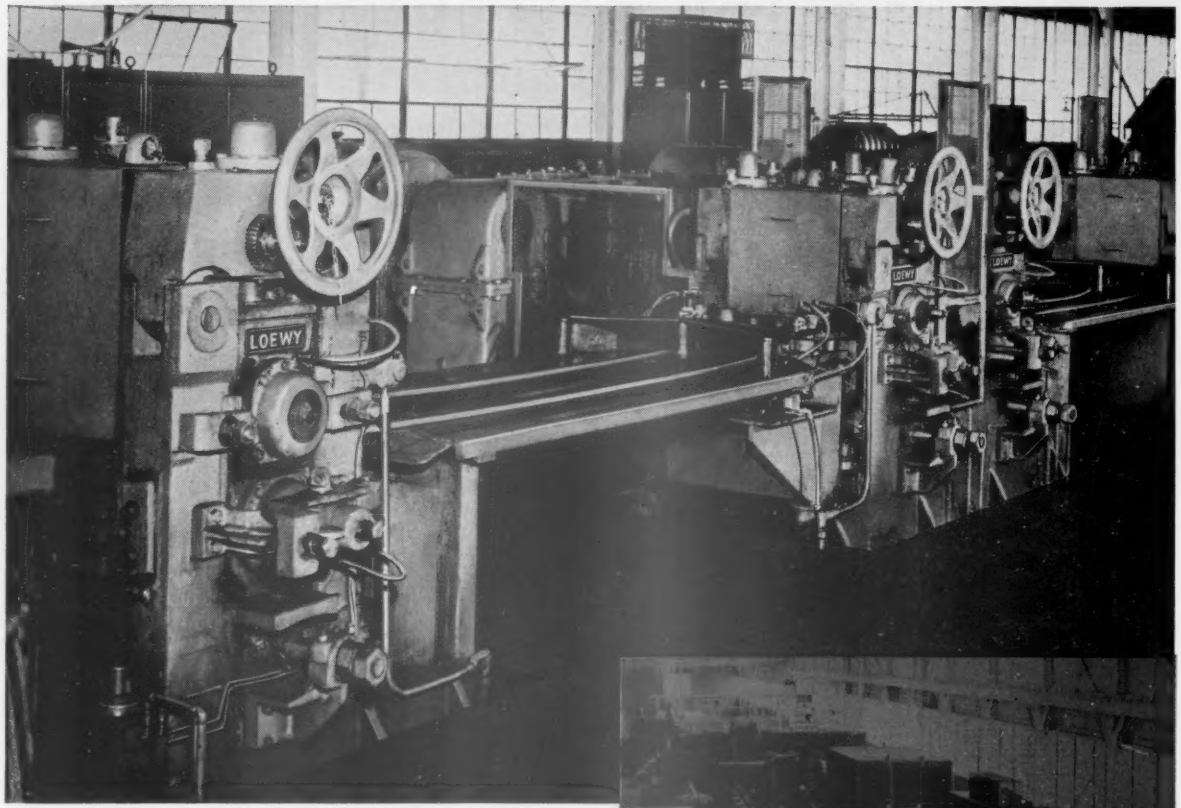
Write for complete technical and processing data on Opalon 1040, to Monsanto Chemical Company, Plastics Division, Room 760, Springfield 2, Mass.

*Under the THW classification, up to 20% more current can be run through conductors than could be with TW conductors. Smaller conductors can be used, saving conduit space, cutting wiring costs. Maximum operating temperatures raised from 60° to 75°C.

Monsanto®

MONSANTO ACTIVATOR IN **PLASTICS**

NOW! "LOEWY-COMPACT" MILLS for the economical production of copper wire rod



Loewy copper wire rod mill installation—part of 12 and 10-in. continuous finishing train showing entry side for 2-strand operation.

Overall view of 14-pass continuous Loewy wire rod mill

In 1955 Loewy introduced an automatic rolling installation for copper wire rod—a radical departure from the conventional layout. The Loewy concept differed fundamentally from the customary looping stand, which was serviced by tong men and required a considerable crew of highly skilled operators. Loewy has now taken another major stride.

The new "Loewy-Compact" mill features remarkable compactness and automation, optimum precision, and highly economical design. Heretofore it was considered uneconomical to roll smaller quantities of copper wire rod. The capital investment and the space requirements involved in a continuous wire rod mill seemed prohibitive for companies of limited size or those restricted in plant area.

Studies have demonstrated that wire rod in smaller quantities can be profitably produced on this new Loewy wire rod mill.

Avail yourself of our services in order to hold your own in the competitive market. Write Dept. I-9, outlining your requirements.

BALDWIN · LIMA · HAMILTON

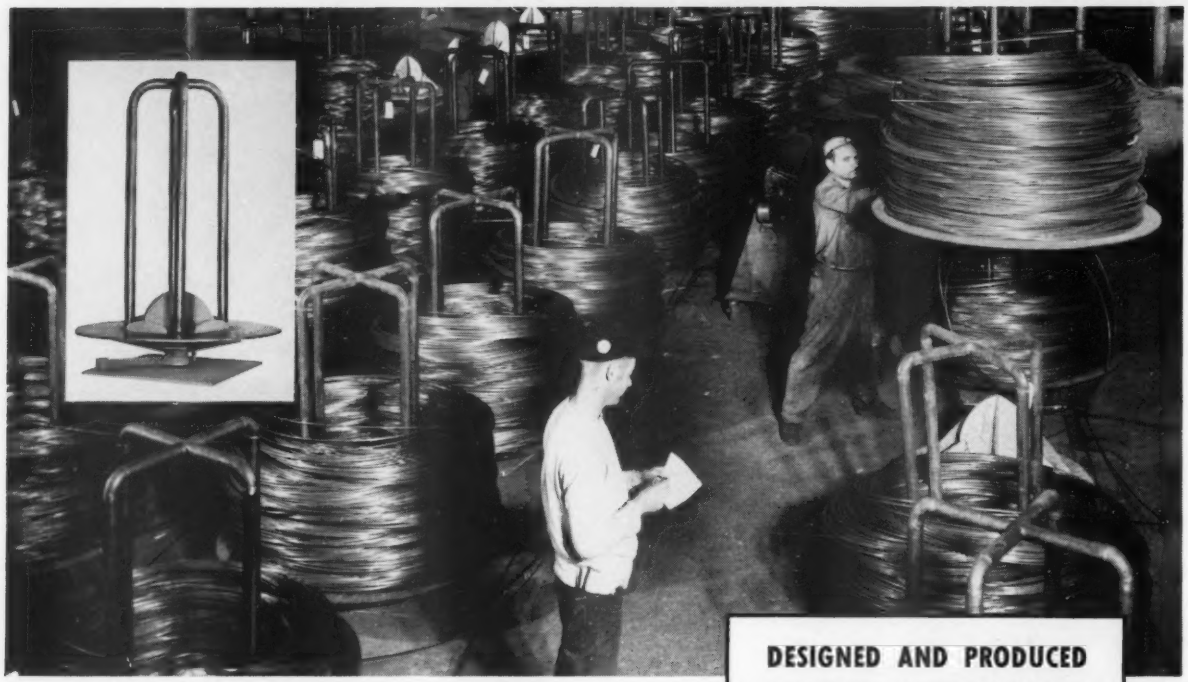
INDUSTRIAL EQUIPMENT DIVISION • PHILADELPHIA 42, PA.

BALDWIN BLH LIMA-HAMILTON

A-1053

WORKING WONDERS WITH WIRE: at Pittsburgh Steel Company's Monessen (Pa.) Fabric Dept.

Northern Indiana Steel's
rugged, new, operation-proved
WIRE CARRIERS and PAY-OFF REELS



PITTSBURGH STEEL'S $111,000,000 EXPANSION PROGRAM called for a new 125-ton 96-inch wire fabric machine, among many other improvements. To feed this monster, Pittsburgh's Monessen (Pa.) Works makes efficient use of 45 advance-design Northern Indiana Steel Supply Company Wire Carriers and Pay-Off Reels.

SAYS SID JOHNSON, FABRIC DEPT. SUPER:

"Because these wire carriers can safely carry up to 4,000 pounds—depending on the gauge and footage of wire—they help us reduce downtime on this new machine. We now need to weld new reels of wire only every 16 hours, the equivalent of two working turns."

In addition, 500 other Northern Indiana wire carriers have been found ideal by Pittsburgh for *storing* wire. The carriers are easily stacked, leaving maximum use of floor area. Result: good housekeeping with minimum effort.

DESIGNED AND PRODUCED TO YOUR SPECIFICATIONS

Wire Carriers and Reels that

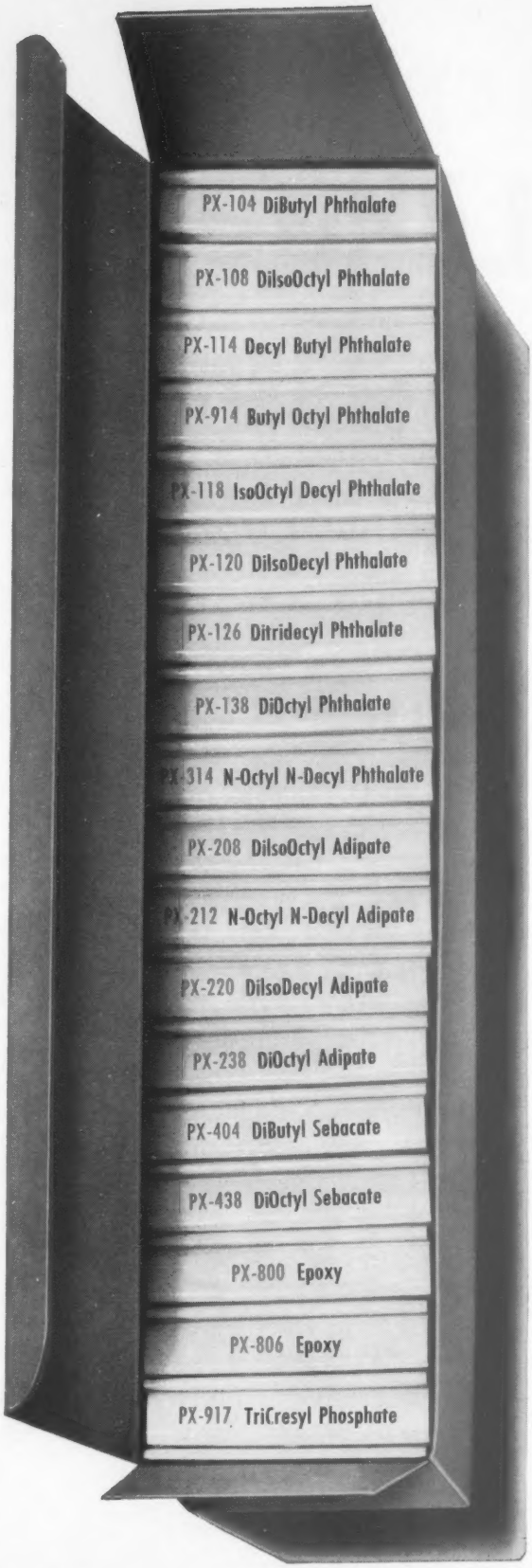
- ✓ **FEED MORE SMOOTHLY**
- ✓ **CARRY UP TO 4,000 LBS.**
- ✓ **STACK AND STORE EASILY**

Let us know exactly what your operating needs require. If we don't already have it in stock, we're ready to make up your order as per your specifications. In any case, we'll be pleased to quote you promptly in quantities specified.

NORTHERN INDIANA STEEL SUPPLY CO., INC.

Fabricating Division, Michigan City, Indiana

TELEPHONE TRiangle 4-3241



There's a Pittsburgh PX Plasticizer to match every compounding need!

WHAT special properties do *your* vinyl products require? Low temperature flexibility? Low volatility? Rock bottom economy? *Whatever* your needs, Pittsburgh can fill them promptly and efficiently from its broad family of *Job-Rated* Pittsburgh PX Plasticizers.

The nation's plastics industry uses millions of pounds of Pittsburgh PX Plasticizers each month. And every pound is backed by an assurance of unsurpassed quality, experienced technical assistance and prompt, reliable deliveries.

As a basic plasticizer manufacturer, Pittsburgh may be able to help you improve the quality and reduce the cost of *your* plastic products. *Write or call today for more information.*

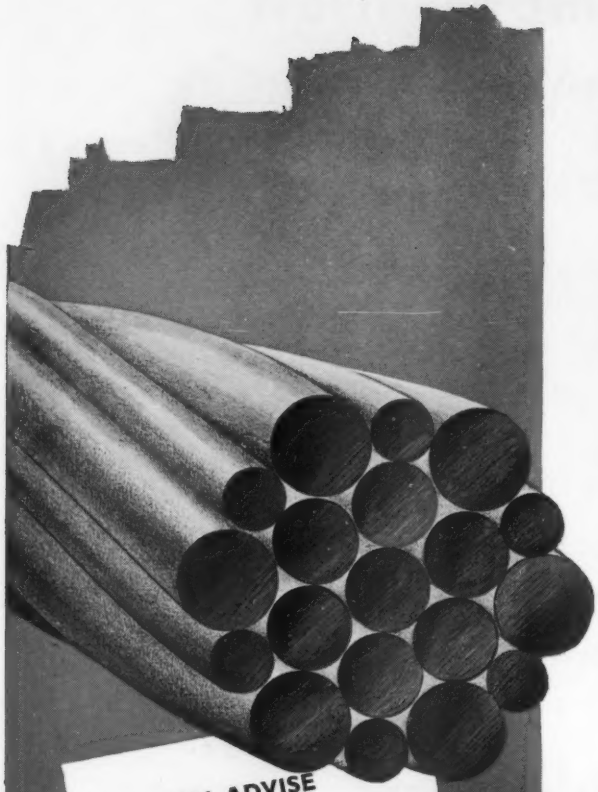
INDUSTRIAL CHEMICALS DIVISION

PITTSBURGH CHEMICAL CO.

GRANT BUILDING PITTSBURGH 19, PA.

A Subsidiary of PITTSBURGH COKE & CHEMICAL CO.

1215



WE CAN ADVISE
ON THE AVAILABILITY
OF JACKS AND GRIPS
FOR LARGE STRANDS

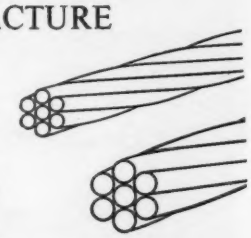
LARGE STRANDS

for prestressed concrete

❀ ❀ ❀

WE ALSO MANUFACTURE

SMALL STRANDS

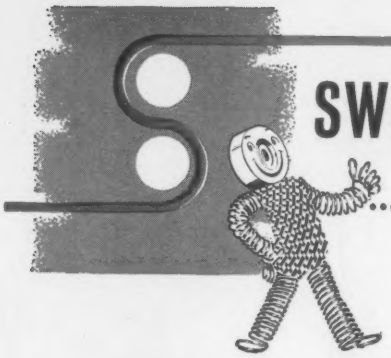


and plain, indented or crimped wires

RYLANDS

Brothers Limited

WARRINGTON
ENGLAND



SWIFT'S ANTI-FRICTION ACTIVITIES

FREDDIE F. REPORTS ON:

Versatile lubricant for dry drawing bright wire and also hot dip-dry film coatings

This multi-purpose lubricant provides a dry film coating for deep drawing steel, chrome and nickel alloys, as well as non-ferrous metals. Operational usage includes tube drawing, sizing, extruding and shape drawing.

Fleximet S, as a dry lubricant, promotes *plating quality* finish in multiple, high speed drafting of high and low carbon steel. Aluminum, bronze and other special metal alloys may also be drawn to a bright finish.

Extremely low in moisture, Fleximet S normally gives a dry, bright, *clean* finish and outstanding lubrication with light lime, phosphate or borax precoating.

WRITE FOR BULLETIN 26

FLEXIMET*

S

METALLIC BASE LUBRICANT

Rich, sodium stearate base, formulated with corrosion inhibitor and bonding aid.

TAKE ANTI-FRICTION ACTION with versatile FLEXIMET* products—developed to serve your industry better

For drawing heavy gauge . . .

FLEXIMET MCA

A high titer calcium stearate complex for high speed multiple-hole draw benches. *Write for Bulletin 24.*

For high heat stability . . .

FLEXIMET PCM

Fortified with extreme pressure additives to provide a protective, nonreactive coating which remains stable even after being subjected to stress relief heat treatment. *Write for Bulletin 46.*

For versatility . . .

FLEXIMET MCF

A versatile, fine mesh drawing compound for high speed drawing. For either high or low carbon steel, aluminum, stainless, and titanium alloys. Extremely low moisture. *Write for Bulletin 25.*

For cold heading . . .

FLEXIMET MCL

A lean lubricant. Especially formulated to provide protection and quick release—without excessive build-up on heading dies. *Write for Bulletin 44.*

For hard-to-work metals . . .

FLEXIMET M2DS

Compounded to help upgrade production rates on "tough jobs"—drawing mechanically descaled rod, high manganese steel, etc. Engineered for top lubrication and extended die life. Effective for multiple drafting at high speeds. *Write for Bulletin 45.*

Swift

105TH YEAR

*TRADEMARK OF SWIFT & COMPANY

SWIFT & COMPANY · SOAP DEPARTMENT

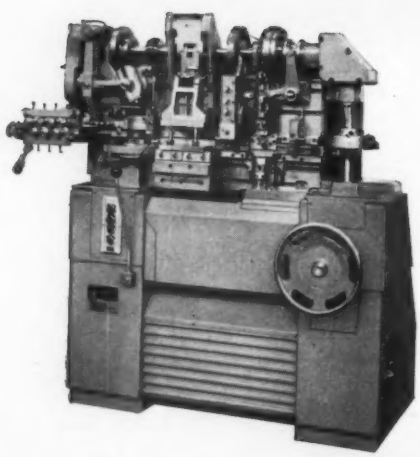
4115 Packers Ave., Chicago 9, Illinois

To Serve Your Industry Better

S-73

THESE PARTS ARE BEING PRODUCED AT SPEEDS OF 90 TO 250 PCS/MIN

PROFIT-TREE!



These are formed parts produced in single automatic operations on the revolutionary new Torrington Vertical 4-Slide.

With precision and speed, the Verti-Slide has replaced as many as five and six progressively tooled presses in the production of a complex part. Normal secondary operations such as welding are being done in one continuous automatic operation in excess of 100 pcs/min.

If you make or buy complex wire or strip parts, the Verti-Slide method offers dramatic reductions in production cost. Less parts handling, in process inventory, machine space—all mean greater profits to you.

Write or call for field technical data or a Torrington Sales Engineer.

THE TORRINGTON MANUFACTURING COMPANY

MACHINE DIVISION Torrington, Connecticut

Stop looking for spring wire in large coils...it's here (*courtesy of Roebling*)

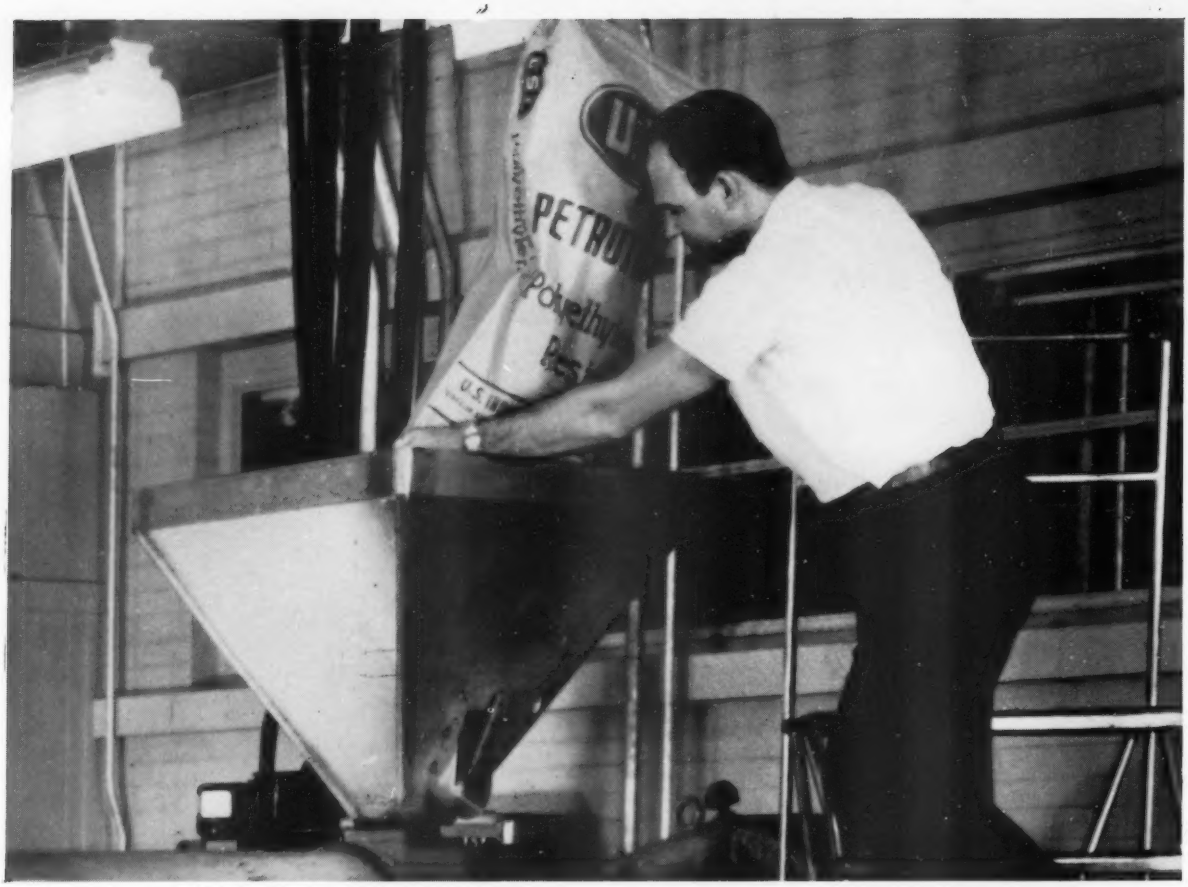
This is really an enormous availability — 3000 pounds of high carbon spring wire in a single, nonstop coil. You know what this means. Uninterrupted productivity. You make more of your products faster and, as with *any* length of Roebling spring wire, you make them better.

This, of course, is in addition to the already wide selection of Roebling wire in all kinds of sizes and gauges. Whatever you specify in spring wire — for quality — the word that comes first is Roebling.

For information on *any* size coil, ask Roebling's Wire and Cold Rolled Steel Products Division, Trenton 2, New Jersey.

ROEBLING

Branch Offices in Principal Cities
John A. Roebling's Sons Division
The Colorado Fuel and Iron Corporation



You charge the resin as received when you produce polyethylene-covered wire

because polyethylene needs no blending

Manufacturing polyethylene-covered line wire is simple. You feed the resin, as you receive it, to the extruder. There are no plasticizers, softeners, antioxidants to add. There's no prebatching, blending, milling; no vulcanizing after extrusion. Carbon black and antioxidants are already in the resin.

A complete polyethylene production program simplifies operations in other ways too. One production line can take the place of several, providing savings in equipment, floor space, maintenance and labor. Stocking only one material reduces purchasing and inventory problems.

With polyethylene, you base production on a material that has trended downward in price as capacity increased. And ample capacity for PETROTHENE® polyethylene insures continuous supplies of uniformly high-quality resin.

Look To Tomorrow's Sales

See how polyethylene can improve the profitability of your operations tomorrow, if not today. With other insulating costs trending upward, polyethylene can be expected to be your most profitable line wire coating in the years to come. You can prepare for those profits *by promoting polyethylene-covered line wire now*, just as U.S.I. is doing in a series of advertisements in utility magazines.

For your customers, polyethylene means a product that is easy to handle . . . has exceptional weather and stress-crack resistance . . . is long-lasting in service. This tough plastic covering is registering outstanding service records for power cable, communications cable, WD-1 infantry field wire, TV lead wire and many other applications.

U.S.I. PETROTHENE polyethylene resins are tailored to provide the proper balance of properties needed in different end uses. To help you choose the most suitable resin for each use, we've compiled a chart of the properties, applications and applicable specifications of PETROTHENE polyethylene compounds. This information is in a new four-page data sheet, "PETROTHENE Resins for the Wire and Cable Industry." Also available is U.S.I.'s comprehensive 100-page "PETROTHENE Polyethylene . . . A Processing Guide." Write for your copies.

U. S. Industrial Chemicals Co.
Division of National Distillers and Chemical Corp.
99 Park Ave., New York 16, N. Y.

Please send me:

☐ "PETROTHENE Resins for the Wire and Cable Industry"
☐ "PETROTHENE Polyethylene . . . a Processing Guide"

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Company_____

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U.S.I. INDUSTRIAL CHEMICALS CO.
Division of National Distillers and Chemical Corp.
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Branches in principal cities

WHAT'S NEW IN ROD AND WIRE ANNEALING?

There's always something new at Lee Wilson, for Wilson engineers are constantly working to develop faster, more economical methods for annealing, handling, and processing rod and wire. It's no coincidence that leading wire makers the world over make Lee Wilson their choice for annealing, spheroidizing and patenting furnaces, heat treating lines, and galvanizing equipment. Why not make sure your production equipment enables you to compete profitably. Consult with a specialist—your Lee Wilson sales engineer.

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HIGH CONVECTION ANNEALING FURNACES
MAKE THE BEST METALS BETTER
*ORIGINATORS AND LEADING PRODUCERS OF HIGH CONVECTION ANNEALING FURNACES

MARATHON STEEL WIRE

For all specialized steel wire applications, particularly for rollers, balls and needles in anti-friction bearings, Marathon offers advantages derived from more than 150 years experience in specialty steels. Marathon assures best workability and uniform quality of steel wire of all types —alloy, high speed, stainless, tool, heat resistant—available straight or in coils. Specify Marathon, too, for high quality forged alloy steel rolls for flat cold rolling. Contact us and expect immediate attention to all inquiries and individual problems.

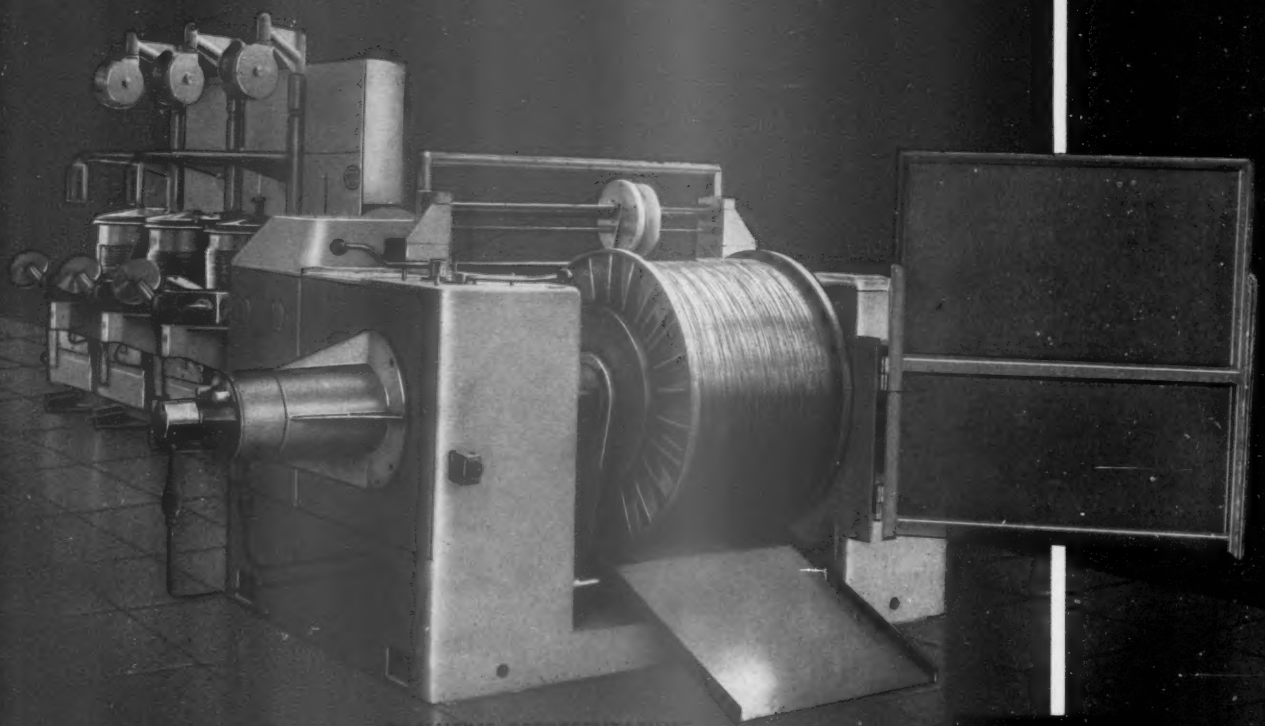
MARATHON

SPECIALTY STEELS, INCORPORATED

A Division of Deutsche Edelstahlwerke A. G., Krefeld, West Germany DEW 375 Park Avenue, New York 22, N. Y.

NEW DEVELOPMENTS CONTINUE!

Modern High-Speed Drawing Unit for producing mild steel wire of sizes between .1" and .08" at 4200 ft. min. on finishing spools up to 3000 lbs. capacity



EXCLUSIVE REPRESENTATIVES FOR U.S.A. AND CANADA

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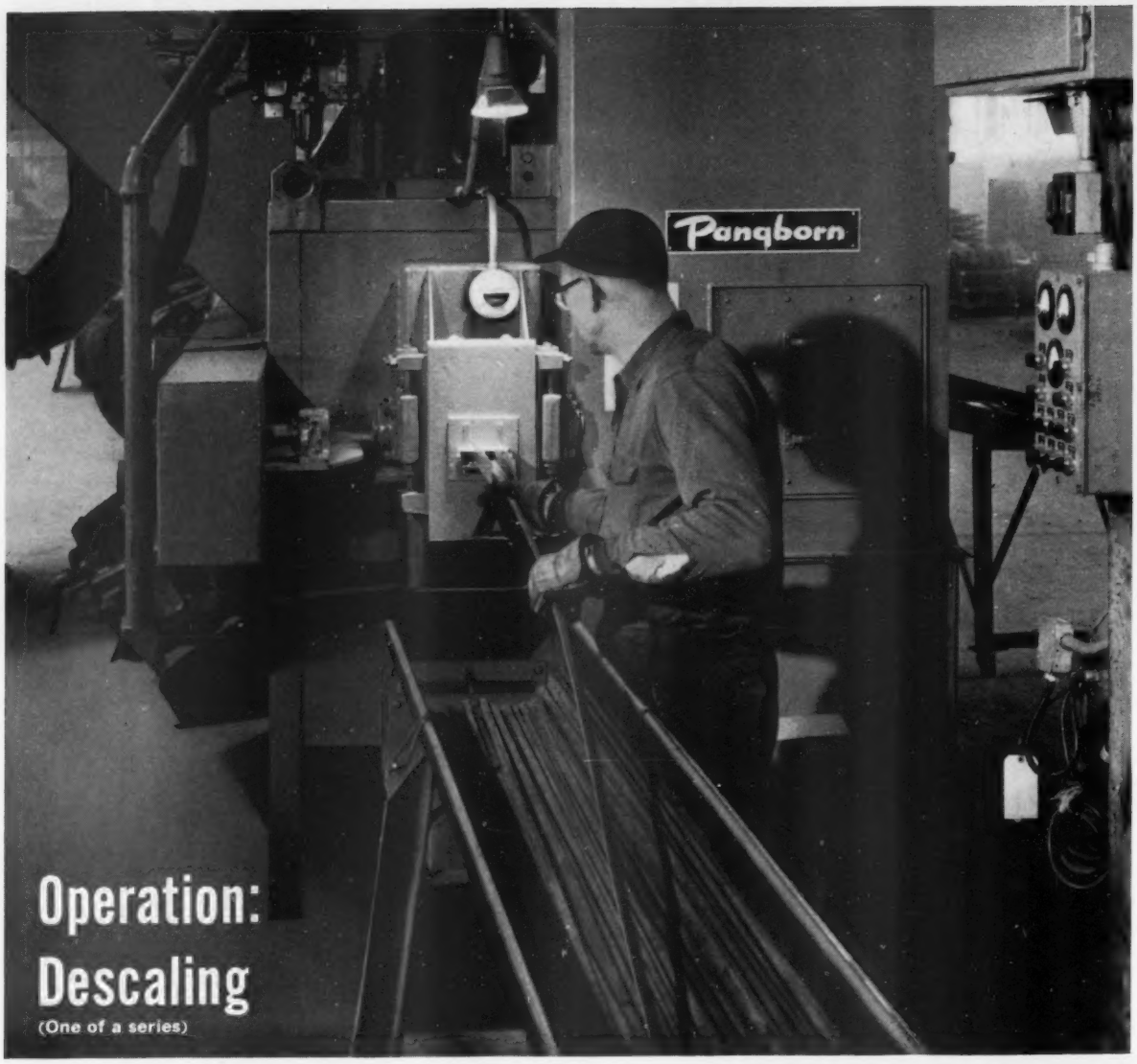
NIEHOFF MACHINE WORKS

SCHWABACH NEAR NURNBERG WESTERN GERMANY



How to eliminate pickling, cut descaling costs

Answer: Rotoblast. For the Pangborn Rotoblast Descaling Machine gives fastener manufacturers and wire producers a truly cost-cutting, convenient method of descaling. It cleans quickly and thoroughly, with a minimum of manpower requirements.

This airless-blast unit can be installed in line with coating and drawing equipment to provide straight-through production; rod can be handled in either cut lengths or coils. Following a patenting furnace, the Pangborn Rotoblast Descaling Machine can descale multiple strands of wire up to 40 or more.

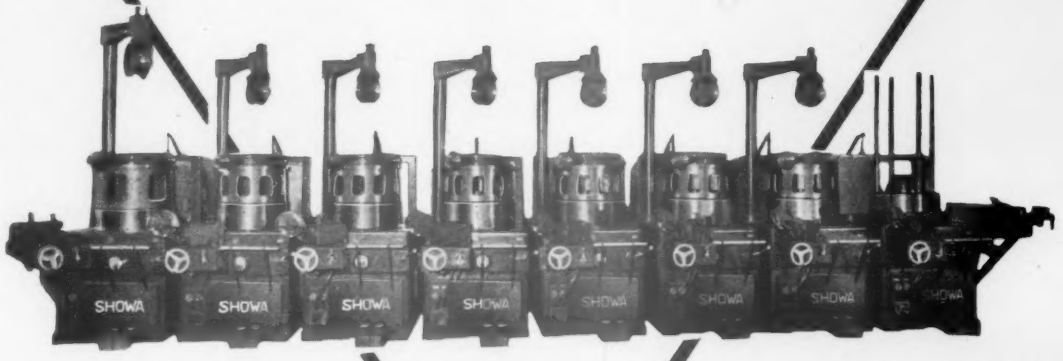
Discover how this unit can cut *your* wire or wire rod descaling costs. Talk to your Pangborn man or write PANGBORN CORPORATION, 5400 Pangborn Blvd., Hagerstown, Md. *Manufacturers of Blast Cleaning, Vibratory, Dust Control Equipment—Rotoblast® Steel Shot and Grit.©*

ROTOBLAST ADVANTAGES OVER PICKLING:

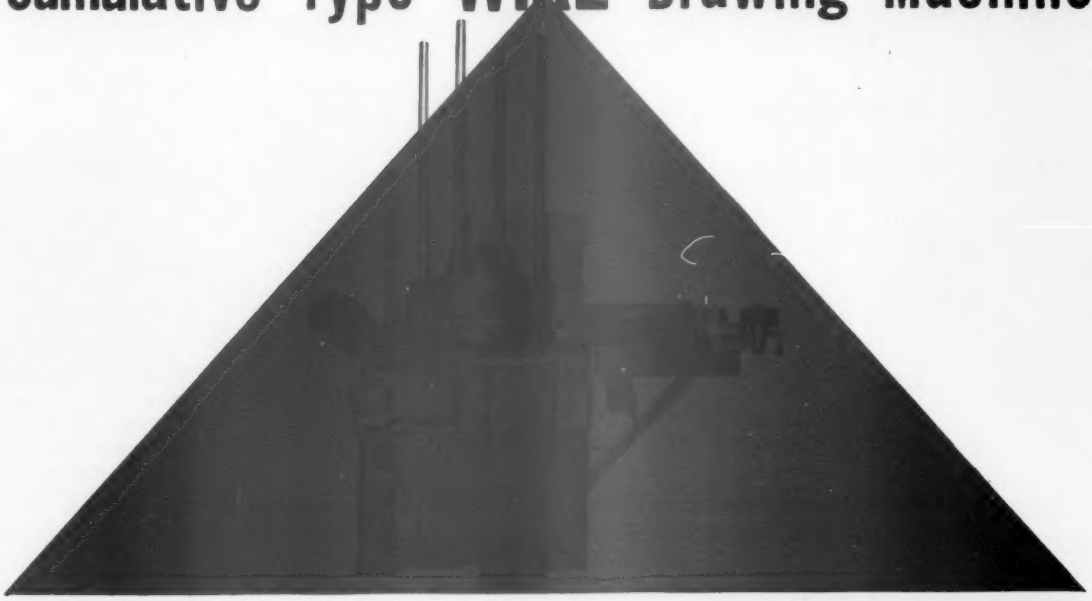
- Lower initial investment; cost savings ranging up to 70% over pickling
- Only ⅓ to ½ as much floor space
- Much faster performance
- Cleaner, safer operation . . . acid disposal problem eliminated
- Less manpower
- Various surface finishes
- High degree of automation

Pangborn
OF HAGERSTOWN

SHOWA

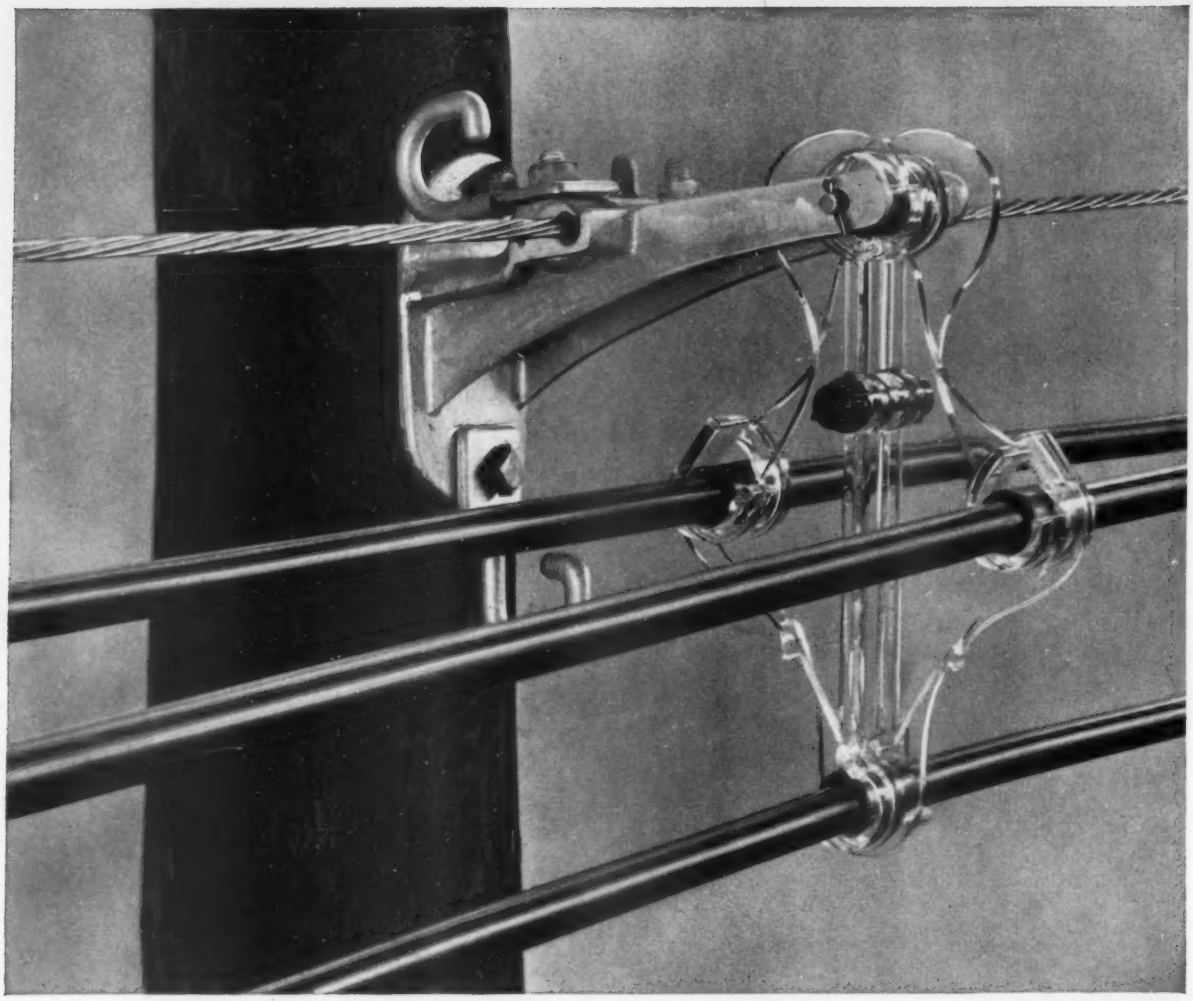


Cumulative Type WIRE Drawing Machine



SHOWA MACHINE WORKS LTD.

No.16, Naka 3-chome, Mitezima, Nishi-Yodogawaku, OSAKA, JAPAN.



FOR TROUBLE-FREE INSTALLATION AND SERVICE...
AERIAL SPACER CABLE INSULATED WITH HIGH-DENSITY POLYETHYLENE

Aerial spacer cable, line wire, and triplex service drop made by Hendrix Wire and Cable Corp. and insulated with BAKELITE Brand high-density polyethylene DGD-4100.

One of the most impressive developments in the past two years has been the quick acceptance of aerial spacer cable insulated with BAKELITE Brand high-density polyethylene DGD-4100. The properties of this new polyethylene are so compelling that one manufacturer, Hendrix Wire & Cable Corp., Milford, N.H., reports that 34 utility customers* in 15 northeastern states have adopted aerial cable, line wire or triplex service drop insulated with DGD-4100.

The abrasion resistance of this high-density polyethylene sharply reduces the chance of injury to insulated phase conductors when stringing over crossarms. It also results in less damage by tree limbs—can even bring some reduction in tree trimming costs.

Along with these benefits, high-density polyethylene provides excellent shear strength, resists environmental and thermal stress cracking, and withstands deformation at high temperatures. These improvements are in addition to the familiar polyethylene advantages such as superior insulating properties, light weight, and ease of handling.

Try wire and cable insulated or jacketed with BAKELITE Brand high-density polyethylene DGD-4100 in your power distribution system and enjoy these multiple benefits. For more information and samples of this material, write Dept. BW-160, Union Carbide Plastics Company, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N.Y. In Canada, Union Carbide Canada Limited, Toronto 12.

UNION CARBIDE

*Names available upon request.

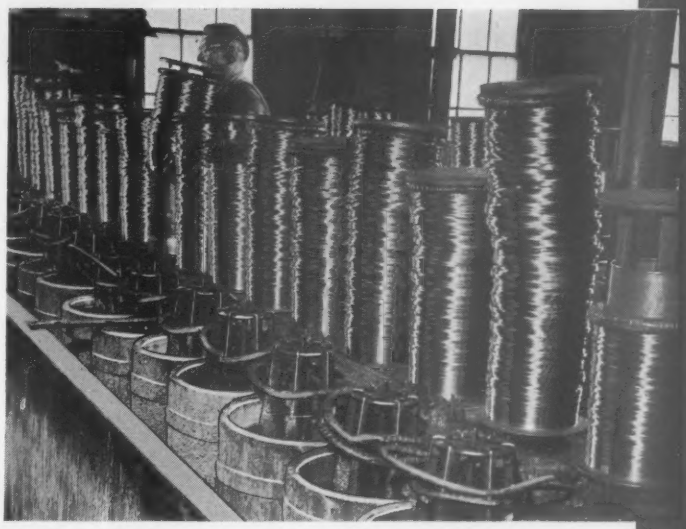
"Bakelite" and "Union Carbide" are registered trade marks of Union Carbide Corporation.

HERBORN

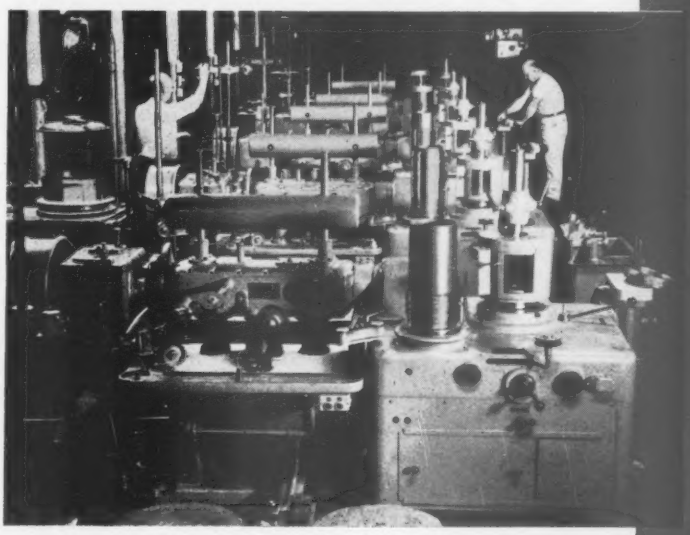
WIRE DRAWING MACHINES

Prentiss

LOWER PRODUCTION COSTS



BEFORE: *Here, wire is being drawn "the old fashioned way."*



AFTER: *Shiny and new, with the look of tomorrow, the new wire drawing equipment of Prentiss produces wire better and faster.*

"HERBORN" TF IIIc Wire Drawing Machines photographed at the plant of Prentiss Wire Mills, Riverside Metal Alloy Division, H. K. Porter Company, Inc., at Holyoke, Mass. Porter Company, Inc., at Holyoke, Massachusetts.

**Photos and text courtesy "Re:Porter," published monthly by H. K. Porter Company, Inc.*

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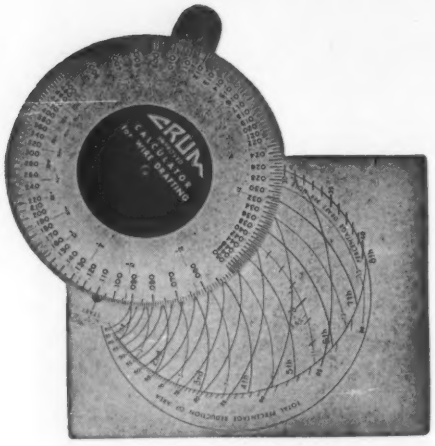
MACHINERY CORP.
61 HUDSON STREET • HACKENSACK, NEW JERSEY
MASCHINENFABRIK HERBORN
Berkenhoff & Drebes A.-G.
Herborn/Dillkreis (Germany)

SAVE SET-UP TIME WITH THE...

CRUM CALCULATOR

FOR WIRE DRAFTING

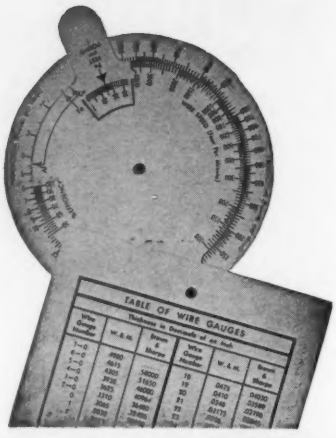
Useful and Accurate!



Front view of Crum Calculator

THIS NEW DOUBLE-PURPOSE CALCULATOR WILL:

1. **Provide quicker and more accurate information on die sizes and reduction areas;**
2. **Calculate wire production rates for various speeds and efficiencies.**



Reverse view of Crum Calculator

SOME OTHER FEATURES OF THE CALCULATOR

- Has new scale for more accurate determination of small percentages.
- Gives readings in B & S gauges.
- Intermediate lines provide reductions for 16 holes in one setting.
- New rectangular shaped back for better protection of calculator.
- More legible % draft-per-hole scale.
- Vinyl plastic construction, resistant to wear, warping, dirt, perspiration, wire drawing soaps—can be cleaned.
- Still fits your vest pocket.
- Handy tables of W & M and B & S gauges.
- Feet per pound calculating scale for steel, copper and aluminum wires.
- Durable, accurate, easy to use.

The improved Crum Calculator is worth its weight in gold in time saving—no laborious mathematical calculations necessary when you use it. Instruction sheet with examples accompany each Calculator. You should have one or more in your wire drawing department.

THE PRICE: $5.00 EACH

Send your orders to:

WIRE AND WIRE PRODUCTS

453 MAIN STREET **STAMFORD, CONN.**

(Exclusive distributors)

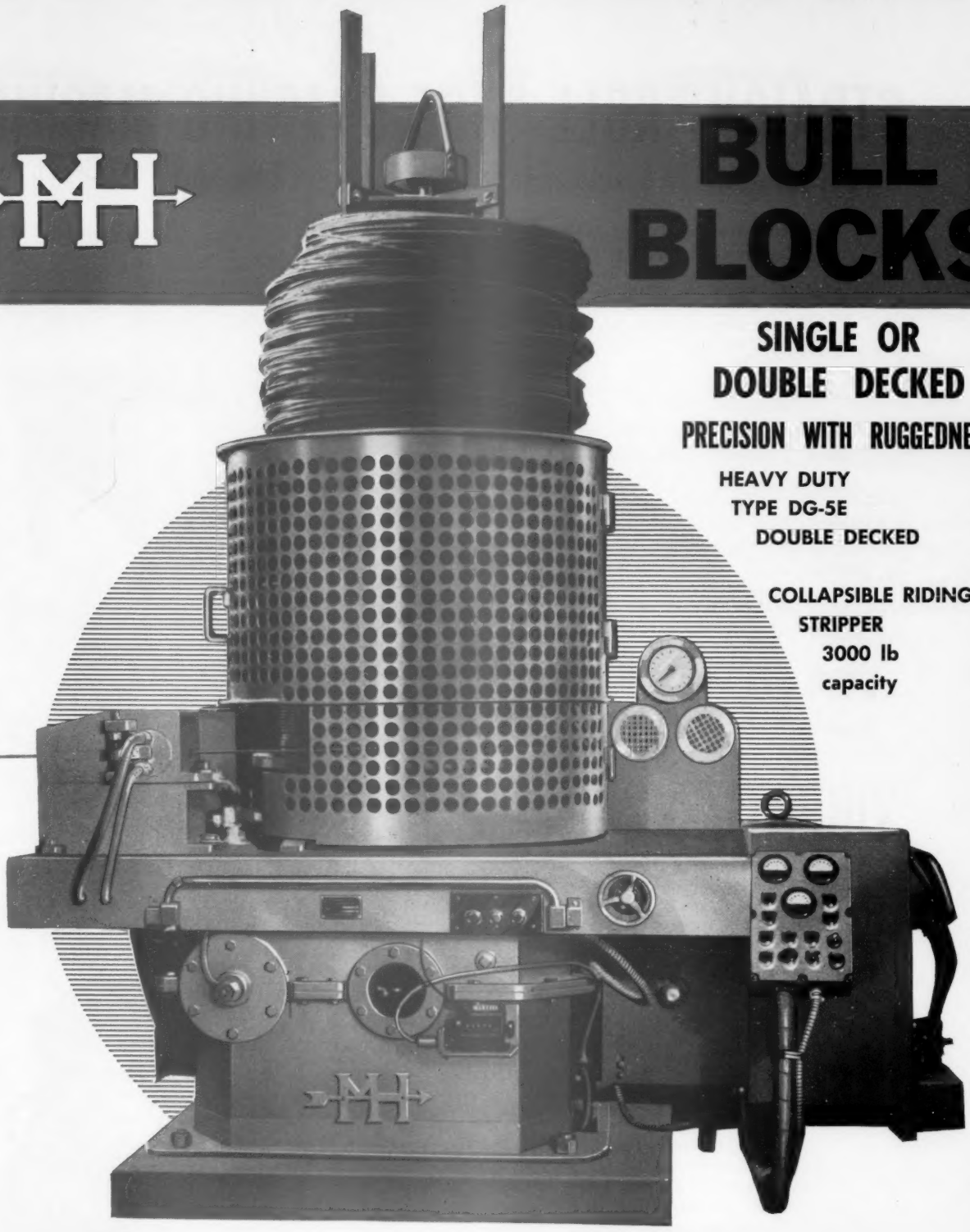
BULL BLOCKS

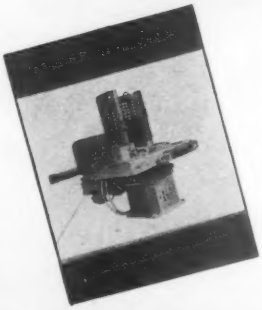
SINGLE OR DOUBLE DECKED

PRECISION WITH RUGGEDNESS

HEAVY DUTY
TYPE DG-5E
DOUBLE DECKED

COLLAPSIBLE RIDING STRIPPER
3000 lb capacity





BULL BLOCK BULLETIN
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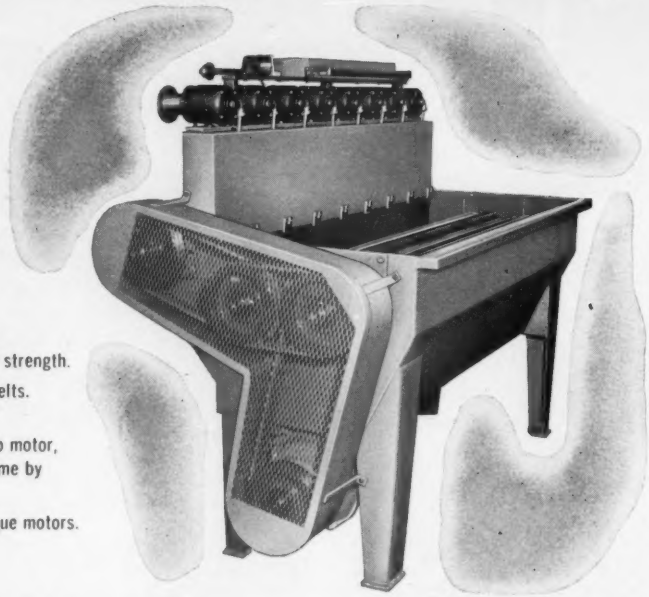
STRAIGHT-ROLL WIRE DRAWING MACHINE

8 HEADER • 14 PASS • 1250 FPM • RUGGED • COMPACT • NO VIBRATION

The Watkins STRAIGHT-ROLL WIRE DRAWING MACHINE

Compact basic design, rugged construction and design detail for maximum rigidity give this machine the ability to handle 8 heads, each having 14 passes and a finishing die, at a wire speed of 1250 FPM and higher within a floor space of 40" x 77" without vibration.



ROLLS Two drive rolls, one capstan roll in close-coupled arrangement. 5" diameter. Easy removal.

TUB All-welded construction. Heavy plate.

SHAFTS 2" diameter. Journaled in heavy duty flange-type ball bearings. Shaft seals in tub walls.

DIE HOLDER Extra-heavy construction for maximum rigidity and strength.

MAIN DRIVE 7.5 HP 220/440 Volt electric motor. Double vee belts. Removable guard.

TRAVERSE Travel is adjustable from 3" to 6". Gearhead servo motor, controlled by limit switches, actuates traverse frame by rack and pinion drive. Mechanism enclosed.

SPOOLING Finished wire led to spools on shafts of eight torque motors. Individual ON-OFF and speed controls.

R S WIRE MACHINES

R. S. WATKINS & SONS, INC. Glen Road, Sandy Hook, Conn.

VIBRATING WIRE CUTTER

REMOVES WIRE FROM SPOOLS IN SECONDS

R S WIRE MACHINES

The Watkins Vibrating Wire Cutter is a unique machine that permits removal of fine wire from full or partially filled spools in seconds. Rapid removal allows spools to be reclaimed and wire to be salvaged without recourse to costly hand methods.

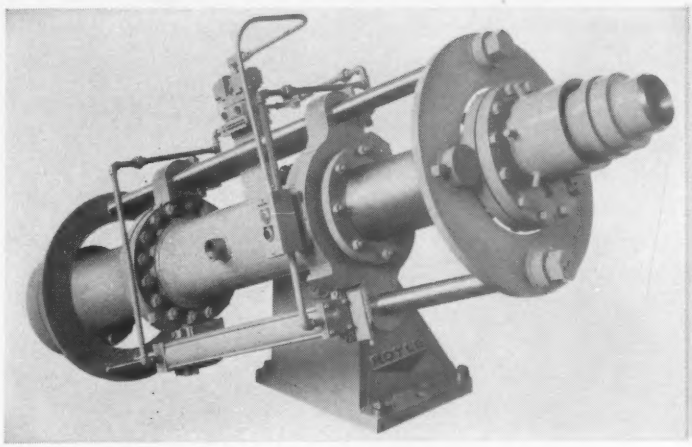
Revolutionary in design, the unique operating principle of the machine allows simple, straightforward construction with design features that contribute to ease of operation and long service life. Tests conducted under actual production operating conditions have proved unit capability. The simple operating procedure can be learned in a very short time. All mechanism is totally enclosed and operates in oil. The cutting member does not harm the spool, yet slices easily through any number of turns of wire without effort by the operator.

A guide table provides quick reference of spool position for optimum cutting action. Table position is adjustable to accommodate spools from 2" to 6" in diameter. Descriptive literature is available. Inquiries are invited.

R. S. WATKINS & SONS, INC. Glen Road, Sandy Hook, Conn.

ROYLE

helps take the problems out of high voltage cable production



Another "first" for the Wire Industry from Royle is the complete, new Royle line of Splice Boxes for Vector* and conventional CV. Pneumatically powered Royle Splice Boxes will cut down-time costs and speed up operations.

Vector* Splice Box

If high voltage cable is creating production problems for you, Vector* CV could prove to be the answer. Vector* CV has shown its production ability day in and day out—with large and small cable—long and short lengths.
All types are economically produced with versatility, full cycle vulcanization and pressure cooling at speeds usually associated with horizontal CV.

Royle patented Auxiliary Seal assures economical production of short length cable.

Royle Auxiliary Equipment:

Engineered Capstan Systems
Splice Boxes
Roller Feed Hoppers
Take-Ups
Vulcanizing Tubes (conventional and catenary)
Pressure Cooling Systems
Pump and Seal Assemblies

Call your Royle Engineer—have him design a Vector* CV tailored to your specific requirements . . . all without extensive—and expensive—building alterations.

**Patented*

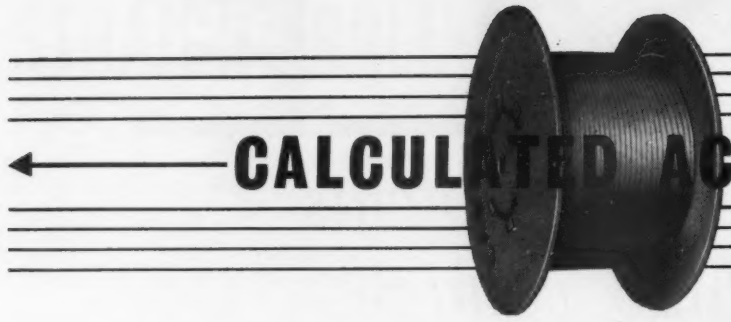
ROYLE
Paterson, N. J.

JOHN ROYLE & SONS

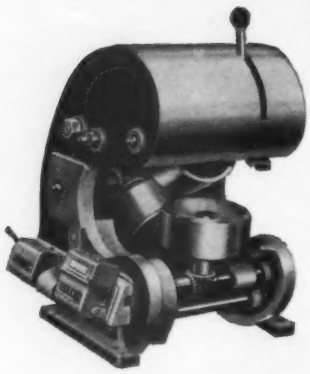
John Royle & Sons, 10 Essex Street, Paterson 3, New Jersey
Pioneered the Continuous Extrusion Process in 1880

Home Office, V. M. Hovey, J. W. VanRiper, SHerwood 2-8262. **Akron, Ohio,** J. C. Clinefelter Co., BLackstone 3-9222. **Downey, Cal.,** H. M. Royal, Inc., TOpaz 1-0371. **London, England,** James Day (Machinery) Ltd., Hyde Park 2430-0456. **Tokyo, Japan,** Okura Trading Company, Ltd., (56) 2130-2149.

CALCULATED ACCURACY



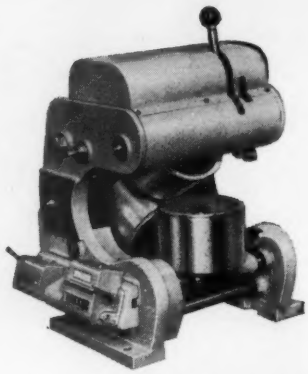
Are you interested in saving the wire, rope and cable you are now scrapping and giving away? "General" three-wheel length measuring machines are proved to be the most consistent and accurate obtainable. Used on many processing lines these machines are capable of any accuracy closer than 0.05%



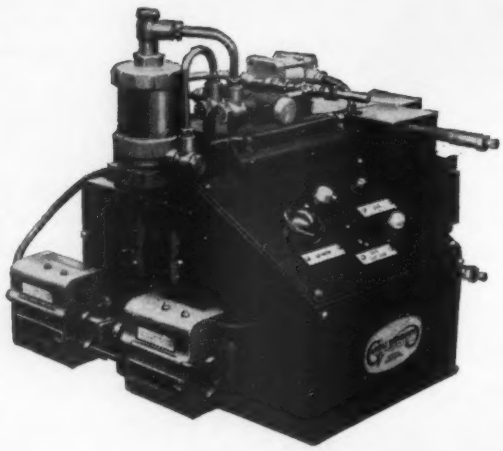
The LV5 machine above is designed to handle cable or wire rope from ⅜ in. to 5 in. diameter, and to facilitate side entry.

GENERAL

GENERAL ENGINEERING CO (RADCLIFFE) LTD



The LV3 above will handle diameters between ⅜ in. and 3 in. Like the LV5 this machine permits side entry of the wire or cable.



The LV0 alongside is shown with automatic cutting attachment and surface fault detector. It will measure wire from 0.010 in. to 1 in. diameter.

Pre-determining counters with lever or automatic re-set. Dekatron electronic counters.

For full details complete coupon below.

GENERAL ENGINEERING CO (RADCLIFFE) LTD

Bury Road, Radcliffe, Manchester, England

Please send me full details regarding your

LV0 ( ) LV3 ( ) LV5 ( )

measuring machines.

Send also details of your automatic cutting attachment ( ), surface fault detector ( ).

NAME .....

ADDRESS .....

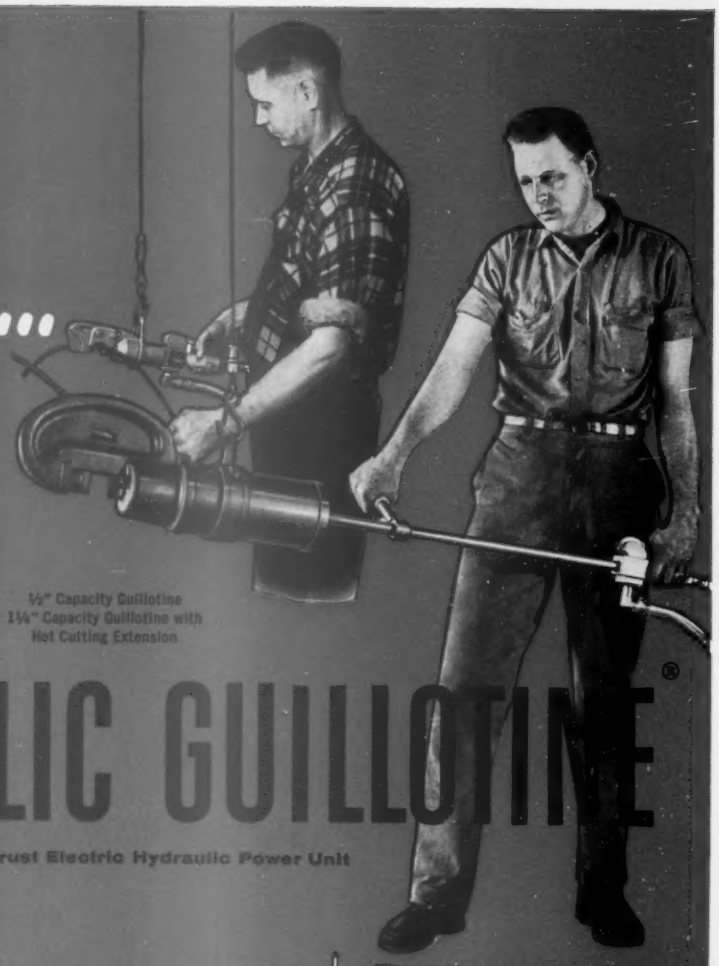
.....

FIRM .....

W. W. P.

Fastest, Lowest Cost...

METHOD FOR CUTTING WIRE AND ROD



½" Capacity Guillotine
1¼" Capacity Guillotine with Hot Cutting Extension

MANCO

HYDRAULIC GUILLOTINE®

Powered by Manco Hi-Thrust Electric Hydraulic Power Unit

ENGINEERED FOR MINIMUM MAINTENANCE

These are completely re-engineered and redesigned versions of the famous Manco Hydraulic Guillotines used by virtually all major rod mills throughout the world. These new units provide even greater performance . . . and require an absolute minimum of maintenance. It is also possible now to operate two cutter heads off one power unit, either by using the new Manco HA-2 Hi Thrust power unit, or by adding the new Manco Auto-Selector Valve to present Manco power units.

Model MC 21: Capacity ½". High speed . . . ¼ second per cut. Full swivel action.

Model MC 35: Capacity 1". Cuts high carbon material including reinforcing rod in only one second per cut.

Model MC 65: Capacity 1¼". Cuts 1¼" diameter steel in 2 seconds per cut. Can be modified to cut 1½" diameter aluminum.

MANCO HYDRAULIC ROD STRAIGHTENER

Ideal for straightening leading end of heavy coiled wire for insertion into drawing dies and cold heading machines. Capacity of ⅜" to 1¼" diameter steel rod.

WRITE FOR CATALOG

MANCO MFG. CO., Bradley, Illinois
Dept. No. W-9

Please send:
Catalog of New Guillotine Wire and Rod Cutters, and Rod Straightener.

Name.....
Firm.....
Street.....
City.....Zone.....State.....

TWO NEW SOLUTIONS FOR "HOT" WIRE PROBLEMS

...FROM YOUR SILICONES MAN

Two new low shrink silicone rubber insulating compounds... developed by the UNION CARBIDE Silicones Man... are now solving many of today's electrical wire and cable insulation problems. Offering good dielectric and physical properties with easy processing, they are ideal materials for air frame applications, motor truck wires, motor leads and hook-ups, small appliance wiring, and marine wiring.

UNION CARBIDE K-1347 Silicone Compound is a premium quality stock that meets tight military and industrial specifications. It has high green strength, remilling is easy, and it is readily colored for coding. Easily extruded, it provides a smooth, non-porous, high gloss surface, and can be braided without postcure. Physical properties are excellent using either steam or hot air cures.

For economy operations where good, but not premium, physical properties are needed, lower cost UNION CARBIDE K-1357 may well fill all requirements. Available precatalyzed in both slabs and coiled strips, it can be fed directly from carton to extruder on most equipment.

Both silicones have outstanding retention of tensile strength and elongation after prolonged exposure to high temperature. Both have dielectric strength of 1000 volts/mil. Both can be cured with either steam or hot air. And both are low shrink compounds. K-1347... for premium properties. K-1357... for economy.

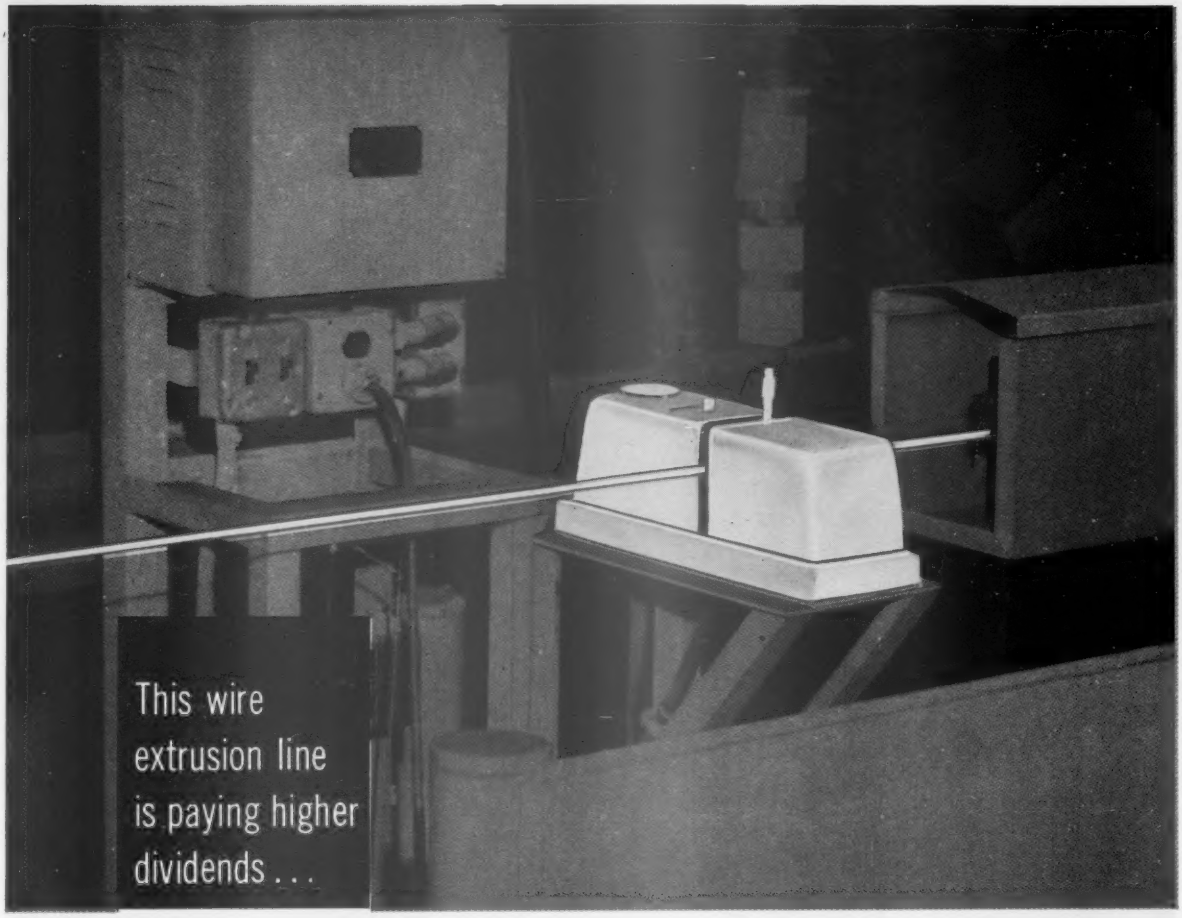
For more information, write or call your UNION CARBIDE Silicones Man, or Dept. IZ-9905, Silicones Division, Union Carbide Corporation, 270 Park Avenue, New York 17, N. Y. *(In Canada:* Bakelite Company, Division of Union Carbide Canada Limited, Toronto 12, Ontario.)

Unlocking the secrets of silicones

Rubber, Monomers, Resins, Oils and Emulsions

UNION CARBIDE **SILICONES**

"Union Carbide" is a registered trade-mark of UCC.



Read how you can cut production costs, boost output with **WESTON MICROLIMIT CONTROL**

You can easily provide continuous, noncontact gauging and automatic regulation of wire production with the Weston Microlimit Gauge. The instrument offers continuous quality control by measuring wire diameter with sensitive photoelectric cells. Almost instantaneous adjustment of production variables is made through the control console.

You can save 2% or more on material costs alone, because expense of overcoating is reduced through closer tolerance control, and start-up waste is cut by 50%. At the same time, you can maintain higher wire production speeds.

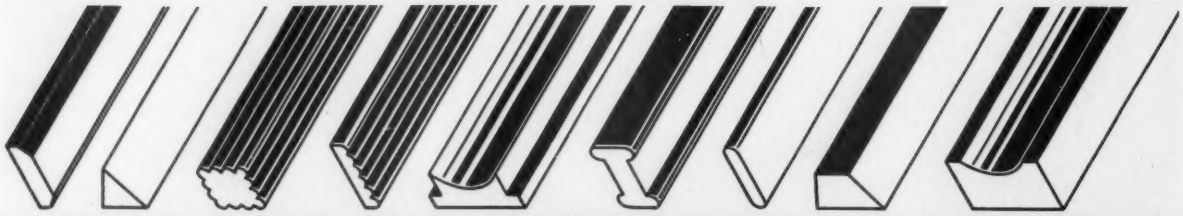
Weston Model 5110 Microlimit Gauges are used for a host of applications, including thermoplastic and rubber insulated wire, extruded tubing, rods, shapes, and filaments, in sizes ranging from .001" to .750".

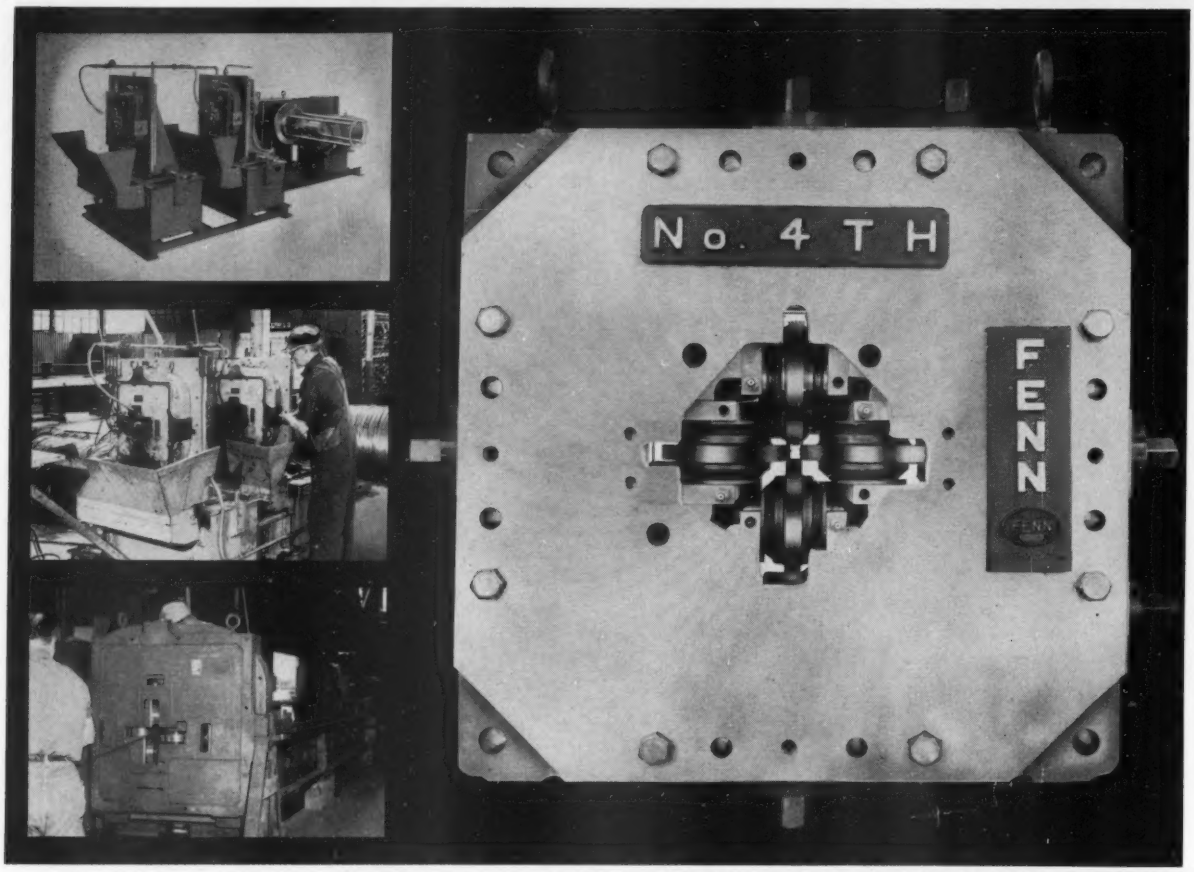
Sensitivity of ±0.1-mil is possible with Model 5110. Direct gauge setting may be made with a calibrated spindle. For extreme accuracy, the unit's deviation indicator is adjusted using a standard reference rod. Standard ranges are: .001/.025"; .025/.5" and .025/.75".

Best results are obtained when the unit is used between extruder and talc box for pan-cure rubber; on either side of capstan for PVC and PE extruders; and between extruder and oven for Teflon and Silicon.

Call your Weston Representative for full details on the Model 5110 Microlimit Gauge, or write: Daystrom, Incorporated, Weston Instruments Division, Newark 12, New Jersey. *International Sales Division: 100 Empire St., Newark 12, New Jersey. In Canada: 840 Caledonia Rd., Toronto 19, Ontario.*

DAYSTROM, INCORPORATED
WESTON INSTRUMENTS DIVISION





Top and Center — *Wire Shaping Mills with tandem Turks Heads.* Bottom — *Turks Head with Draw Bench.* Right — *Fenn Combination Type Turks Head.*

Wire Shaping with FENN Turks Heads

Fenn has pioneered the development of the Turks Head to their present day wide usage for precision production wire shaping. Used on the Wire Shaping Mill (developed by Fenn), on draw benches, or in tandem with Rolling Mills, Fenn Turks Heads produce many precision shapes, both plain and special, such as shown above, with both ferrous and nonferrous wire and rod. They aid in size control, and impart a fine surface finish. Fenn manufactures a complete line in plain, universal, combination and triangular types with bearing capacities at 100 RPM up to 56,400 pounds for heavy reductions. Fenn also makes the important accessories, such as capstans and take-up reels. If it's a wire-shaping problem or requirement, chances are Fenn can help you. Fenn's central engineering department and field engineers are ready to assist you. A copy of the Turks Heads Catalog No. TH56 will be promptly sent upon request.

The Fenn Manufacturing Company, Newington, Conn.

IDEAL

SPECIFIES KEYSTONE WIRE FOR WIRE CONNECTORS

"We use Keystone MB Spring Wire because we know our spring coils will meet rigid specifications. That is the secret of the success of our solderless wire connectors," says Paul Cherry, Plant Superintendent of Ideal Industries, Inc., at the Petersburg, Illinois, plant.

Ideal Industries were the original designers and manufacturers of wire connectors for electric wiring in appliances and home construction. Their "Wire-Nut"* connector with a copper-coated conical spring, securely contained in a plastic cone, is the standard for electrical contractors the world over.

Ideal, a major supplier to world markets, emphasizes quality control by continuous inspection of their tiny wire spring coils.

Keystone's metallurgical and research engineers worked closely with Ideal Industries, Inc., to develop a special MB Spring Wire for its product. Close diameter tolerance, uniform temper throughout the coil, special surface for copper and cadmium plating and lubricant qualities for high-speed production were the results of this research effort.

Delivery is made in moisture-proof fiber drums for protection of plating quality finish during shipment or storage.

Take a cue from Ideal Industries and let Keystone solve your wire problems. Call your Keystone Wire Representative soon or write us for details; we will be pleased to help you.

Keystone Steel & Wire Company, Peoria 7, Illinois

KEYSTONE

WIRE FOR INDUSTRY

*Reg. TM Ideal Industries, Inc.

ALL ELECTRIC

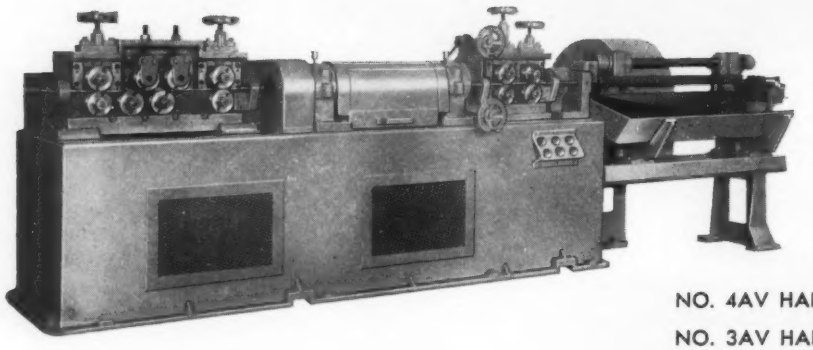
SHUSTER

Wire Straightening and Cutting Machines your BEST BUY!

Dual Control

3AV & 4AV

with **INFINITE SPEEDS**



NO. 4AV HANDLES 11/16" MAX.
NO. 3AV HANDLES 9/16" MAX.

Two famous SHUSTERS, the Variable Speed 4AV and 3AV, now come equipped with all-electric controls. Each has two Infinite Variable Speed Transmissions which allow optimum production on any length, diameter or type of wire. Both the speed of feed, and the speed of cut-off are individually controlled. Other features include positive release electric target, roll type clutch with solenoid control and electro-magnetic brake on clutch shaft.

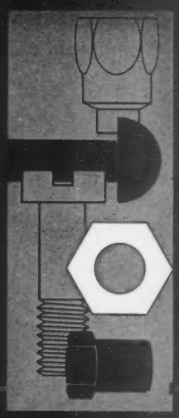
The 4AV handles basic wire 3/8" to 11/16" at 90 to 180 feet per minute or with constant cutting action at 3" to 26" from 85 to 101 cuts per minute.

The 3AV handles basic wire 1/4" to 9/16" at 76 to 228 feet per minute or with constant cutting action at 3" to 30" from 85 to 156 cuts per minute.

Our new line of SHUSTER Wire Straightening and Cutting Machines and Components with capacities from .020" to 11/16" are considered the finest made. Write for Bulletin 37VR.

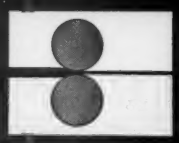
METTLER MACHINE TOOL, INC.

155 W. Adeline, New Haven, Connecticut



COLD HEADING MACHINERY

Cold Headers • Parts Formers • Nut Formers • Slotters • Threaders • Pointers • Trimmers and other Cold and Hot Forming Equipment

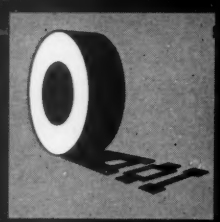


ROLLING MILL MACHINERY

Two-High and Four-High Mills • Special Mills • Sendzimir Mills • Rod Mills • Slitters • Coilers • Winders • Straighteners • Payoffs • Edgers • Coil Boxes • And Other Mill Equipment

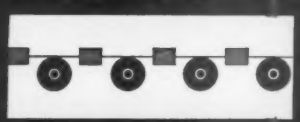
WATERBURY FARREL

MACHINERY BUILDERS



WIRE MILL EQUIPMENT

Continuous Tandem And Upright Cone Wire Drawing Machines • Bull Blocks • Wire Flattening Mills •



Swagers • Roll Pointing Machines • Spoolers • And Other Wire Equipment

POWER PRESSES

Cam and Crank Eyelet Machines • Horizontal Redraw Presses • Multiple Plunger Pillar Presses • High Speed Blanking Presses • Collapsible Tube Equipment • Ammunition Machinery, etc.

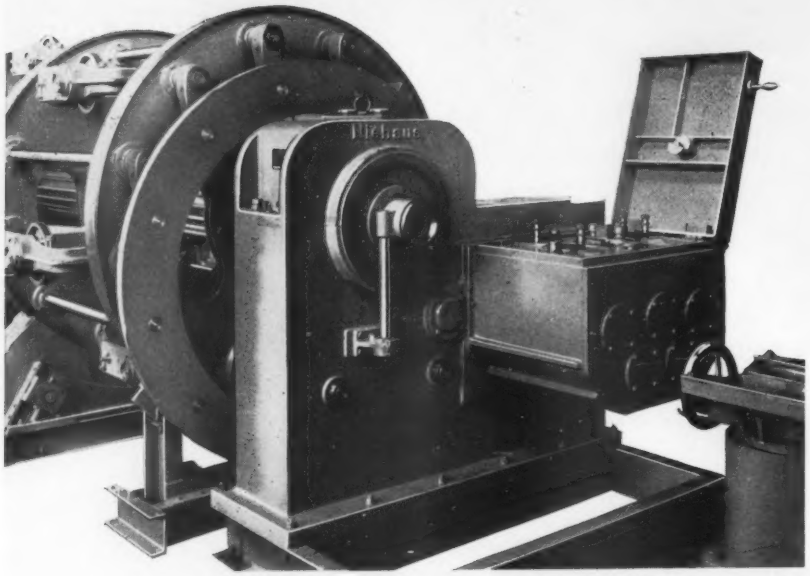
THE WATERBURY FARREL FOUNDRY & MACHINE CO.
DIVISION OF TEXTRON INC.
Waterbury, Connecticut • U.S.A.
Sales Offices: Chicago • Cleveland • Los Angeles • Millburn, N. J.

WF 51R

NIEHAUS

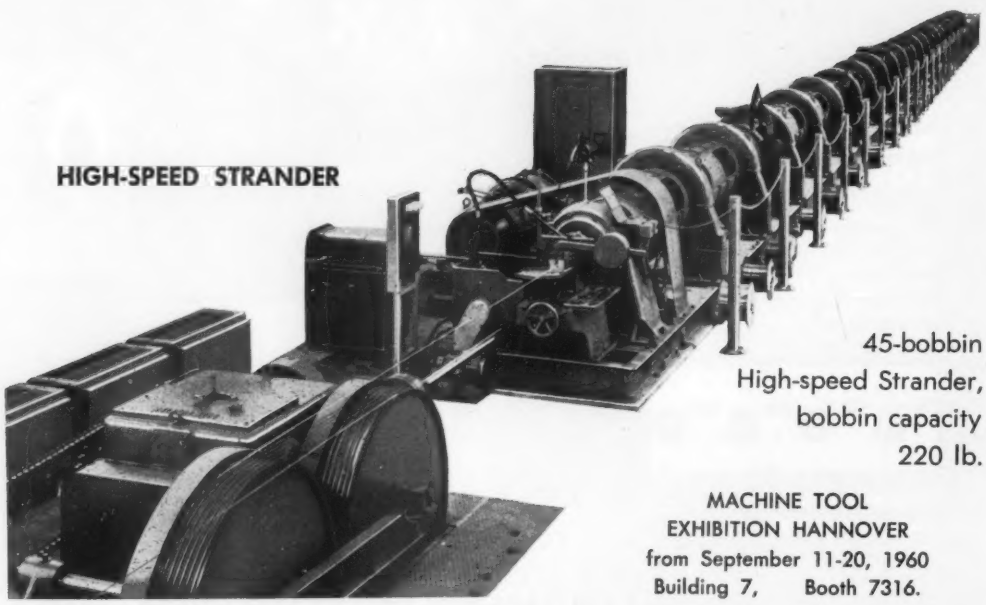
ELECTRIC-CABLE MACHINERY • WIRE-ROPE MACHINERY

PLANETARY STRANDER



We manufacture: Stranding and Rope-closing Machines of tubular and planetary design, of any size and for any number of bobbins, as well as the pertinent auxiliary machinery and equipment.

HIGH-SPEED STRANDER



45-bobbin High-speed Strander, bobbin capacity 220 lb.

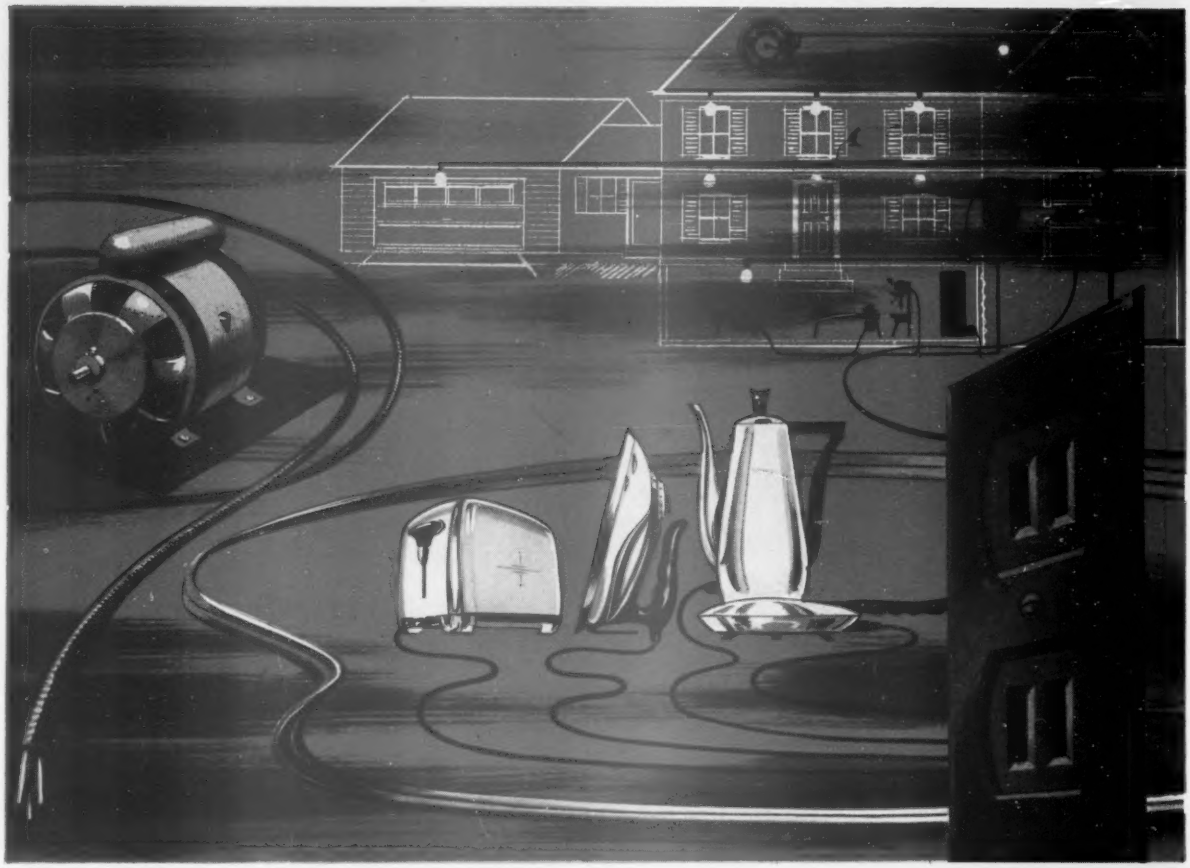
MACHINE TOOL
EXHIBITION HANNOVER
from September 11-20, 1960
Building 7, Booth 7316.

MASCHINENFABRIK K. A. NIEHAUS • DUSSELDORF-RATH

Sole Representative: Paul Reicher Machinery & Equipment, Ltd., 600 Eglinton Ave., East, Toronto 12, Ont., Canada

Naugatuck MARVINOL

POLYVINYL CHLORIDE RESINS



four resins for electrical application

NAUGATUCK now offers the Wire and Cable Industry *more* PVC resins for insulation extrusion than does any other resin manufacturer.

Two of these Marvinol® resins, VR-22 and VR-23, have UL approval. These resins are, respectively, of high and intermediate molecular weight. Both have good dry blending properties.

Marvinol VR-24 and Marvinol VR-25 are resins of progressively lower molecular weights. They provide high volume resistivity in semi-rigid compounds with little or no plasticizer. Both deserve your careful evaluation for future electrical products.

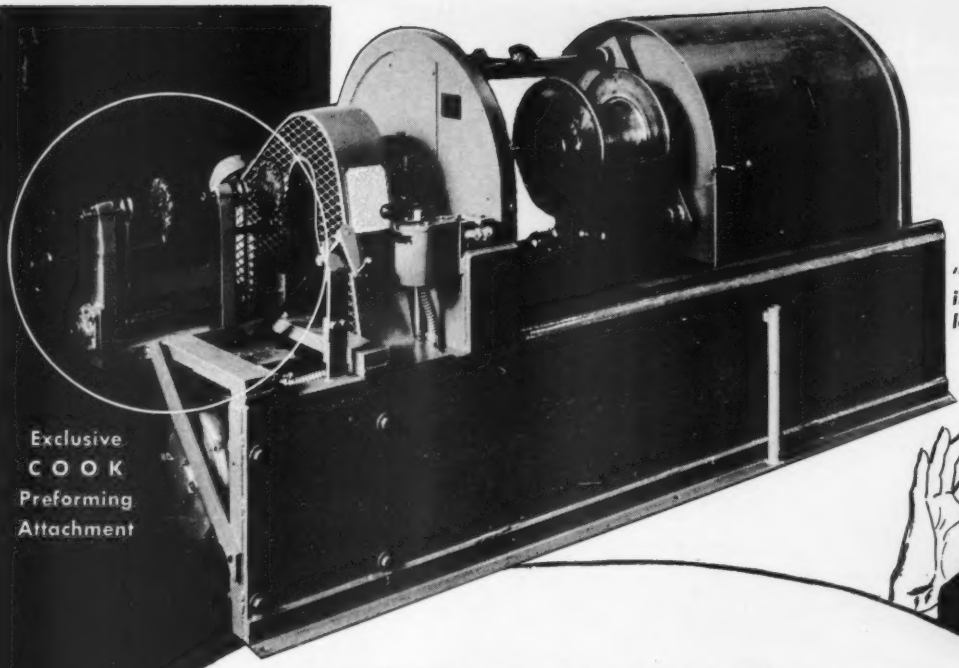
Check with your Marvinol technical representative for complete data and evaluation samples, or write us on your firm's letterhead.

United States Rubber

Naugatuck Chemical Division 929M Elm Street Naugatuck, Connecticut

Rubber Chemicals • Synthetic Rubber • Plastics • Agricultural Chemicals • Reclaimed Rubber • Latices

DIST. OFFICES: Akron • Boston • Gastonia • Chicago • Los Angeles • Memphis • New York • Phila. • CANADA: Naugatuck Chemicals, Elmira, Ont. • CABLE: Rubexport, N.Y.



Exclusive COOK Preforming Attachment

"My job is to get maximum production at the lowest possible cost"

"I've checked plenty of bunching machines . . . but

only COOK bunchers can make perfectly concentric wire!"

All capacities from 45 lbs. to 1000 lbs. All reel sizes from 8" x 6" up to 30" x 11" based on solid copper wire

Now you can speed up production . . . cut the cost of insulating material and labor

The single twist design and large take-up reel are only two of the many outstanding features of COOK bunchers. The single twist principle insures perfectly round bunched wires* at high speed while the **large** take-up reel provides more practical wire packaging sizes for extra long extruder runs. Both these innovations reduce material waste and down time at the extruder.

For production of either concentric wire (with layers of wires in opposite directions of lay) or semi-concentric wire (with layers of wires in the same direction but with different lay to prevent strand locking) you simply can't beat a COOK buncher!

*Bunched wires so perfect that they can pass through an extruding die of only 1 mil clearance

MEET MILITARY SPECIFICATION: MIL-W-5086

Write for free **BUNCHER** catalog sheet

COOK *Manufacturing Co.*

50 EAST 25th ST., PATERSON, N. J. * ARmory 4-6380

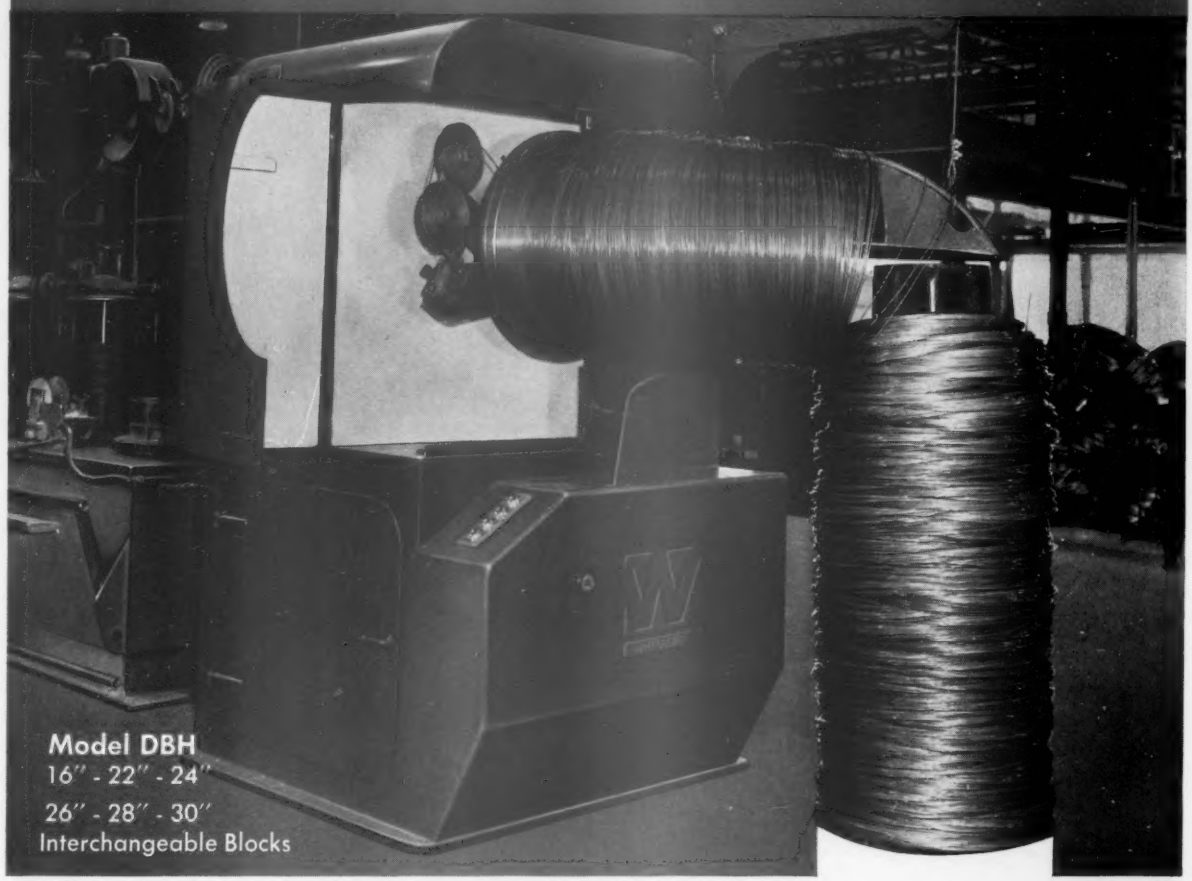
Canadian agent: **E. V. Larson Co., Ltd., Toronto**

European agents: **Capamajian Le Monnier Cie Ltd., Paris**
Knoerzer & Co., Stuttgart, Germany

ASK FOR LITERATURE ON COOK'S HIGH SPEED CABLERS

WHITACRE WIRE DRAWING DEAD BLOCK

Water Cooled Die and Block Available



Save with these advantages:

You get continuous increased production because no down time is necessary for stripping...changing dies in a supplying drawing machine..."run down" of accumulation type machines... packaging into stationery container or uninterrupted palletizing on stems... inspection or sampling. There is no tangling nor snarling from handling • Breaks welded in production • No back gearing nor similar mechanism • You save by greatly reduced floor space requirements • Dead block can be located anywhere with wire literally piped from wire drawing machine • Low scrap loss • Increased production through lessened operator fatigue • Design simplicity • Maintenance eliminated except for occasional lubrication of main bearings and motor bearings • Extra large packages for in-process wire • Greatly reduced handling and in-plant transportation costs • Low capital investment.

MODELS AVAILABLE

16" Wire Drawing Dead Block, Model DBM • Model DBH 16" to 30". Model DBXH 30" Wire Drawing Dead Block for heavy gauges and rods including ⅜" • Combination Galvanizing or Tinning Dead Block Take-ups, 16" to 30", Model GF • 26" Heavy Wire Galvanizing or Tinning Dead Block Take-up, Model GFH. Write today for specifications.

APPROACHES

100%

CONTINUOUS

PRODUCTION

EFFICIENCY

WHITACRE CORPORATION

5649 Alhambra Ave. • Los Angeles 32, California • CApitol 5-2476

For nearly half a century we have been engaged in the development and manufacture of resistance welding machines and it will soon be 15 years since we built our first mesh welder. This many years' experience has proved invaluable in the development of modern mesh welding plants. Today we have a complete range of machines available.

SCHLATTER

Size 1 for light mesh in rolls and sheets, wire ϕ 0,06 to 0,16 inch, width 79 inch
Size 2 for concrete reinforcing steel mesh in rolls and sheets, wire ϕ 0,12 to 0,39, width 104 in.
Size 3 for concrete reinforcing steel mesh in rolls and sheets, wire ϕ 0,12 to 0,39, width 147 in.
Size 4 for concrete reinforcing mesh in sheets, wire ϕ 0,16 to 0,47 inch, width 147 inch
Size 5 for heavy concrete reinforcing steel mesh in sheets, wire ϕ 0,16 to 0,47 in., width 104 in.

H. A. SCHLATTER Ltd. ZOLLIKON-ZURICH (Switzerland)
Manufacturers of Electric Welding Machines and Electronic Controls

Representative for Canada and the U.S.A.

PAUL REICHER MACHINERY and EQUIPMENT, LTD.

600 EGLINGTON AVE., EAST **TORONTO 12, ONT., CANADA**

Another good customer is assured

PREDICTABLE PERFORMANCE

with a SECO **60" SLITTING LINE**

This "custom-built" SECO 60" Slitting Line, recently installed in a midwestern steel company's plant, was designed and built to their exact specifications to provide maximum performance.

Features of this custom-built SECO Slitting Line are:

- Coil weight capacity—40,000 lbs
- 225 fpm line speed with build-up to 735 fpm
- .1875 max. material thickness—5 cuts
- .020 min. material thickness—20 to 30 cuts
- Line arranged to handle sheets or coils
- Power driven hold-down rolls for uncoiling heavy gauge material
- Peeler and Straightener at uncoiler minimizes manual handling
- Variable speed D.C. drive
- Control equipment at operator's desk
- Over-arm separator at recoiler
- Removable housing assembly for quick knife changeover away from slitter

Whatever your requirements, SECO can provide a complete range of Slitting Lines—from 12" to maximum strip widths—as well as other Steel Mill equipment. SECO's staff of trained sales engineers are at your service to assist you with any production problem you may have. Call or write today.

SECO

SECO STEEL MILL EQUIPMENT

- Leveling and Shearing Lines
- Combination Edging and Flattening Lines
- Tension Reels for Strip Polishers
- Narrow Strip Grinding Machines
- Slitting Lines
- Multiple Strand Pull-out Rolls and Take-up Frames
- Strip Coilers (Up and Down Type)
- Traverse Reels for Narrow Strip
- Steel Coil Up-enders
- Scrap Ballers

Affiliated with Lee Wilson Engineering Co., Inc.

STEEL EQUIPMENT COMPANY

P. O. BOX 737, WARRENSVILLE STATION

CLEVELAND 22, OHIO

GRANODRAW SS Lubricant Base 300%, Cuts Heating Costs

Amchem Process Protects and Improves Surface Finish of Stainless Tubing

A 4000-gallon Granodraw SS operation is saving time and equipment, cutting costs and improving quality of stainless stock prior to drawing and reducing at Wallingford Steel—one of the world's largest producers of welded stainless steel tubing. In addition, Amchem Serseal chemical blanket has lowered heat costs, improved working conditions around the bath.

PRODUCTION TIME SAVED

Providing an excellent lubricant base, Granodraw SS has achieved an increase of 300 percent in drawing speeds at Wallingford's stainless tube reducing mill. Easily maintained and extremely stable, the Granodraw SS bath is left standing over a weekend, yet starts immediately in trouble-free operation for Monday morning operations!

VALUABLE EQUIPMENT PROTECTED

By preventing galling and seizing, and metal to metal contact between work and the dies, die life has been significantly increased. Drawing loads are between 20 and 25 percent less since use of Granodraw SS was instituted.

HEATING COSTS REDUCED

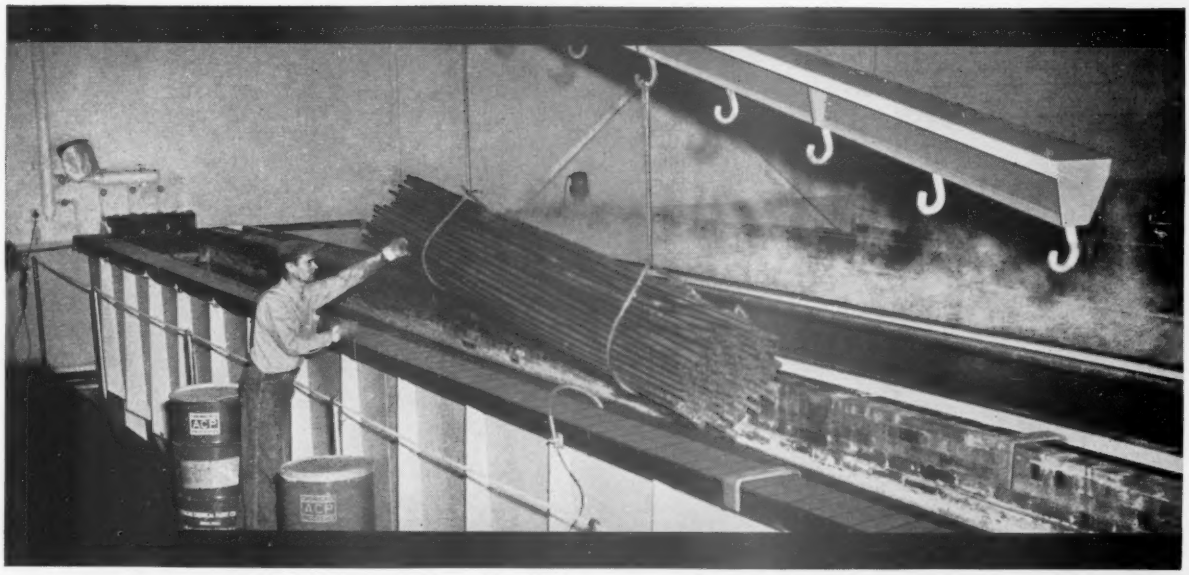
In conjunction with Granodraw SS, the Serseal chemical blanket for drawing operations has racked up additional savings in heat—up to 80 percent!—for Wallingford. With the bath effectively contained by Serseal, working hazards are reduced, corrosive effects are lessened on surrounding equipment—yet efficiency of the oxalate bath is not affected.

SURFACE FINISH IMPROVED

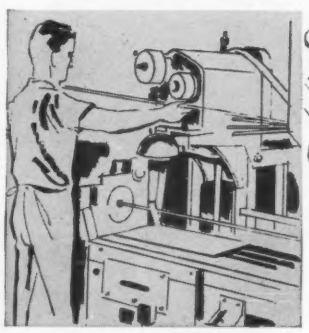
The Granodraw SS oxalate coating reacts with the metal surface, leaving a hard, spongelike deposit to which lubricants readily cling. As the stainless passes through the die, the lubricant melts and recrystallizes absolutely evenly —a sure sign of uniform, friction-free lubricating action and improved surface finish quality.

If your operations involve stainless tubes or wire drawing, cold heading or impact extrusion—find out how Granodraw SS can save you time, equipment and money while boosting product quality!

Increases Drawing Speeds and Rejects at Wallingford Steel!

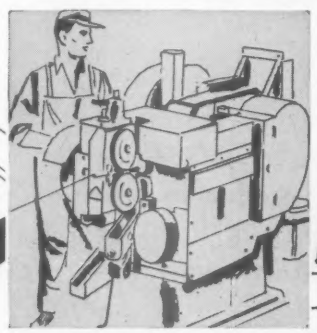


Stainless tubing prior to immersion in Granodraw SS bath at Wallingford Steel. Note absence of steam vapors and fumes, overall cleanliness of operation obtained by use of Amchem Serseal, new heat-reducing chemical blanket.

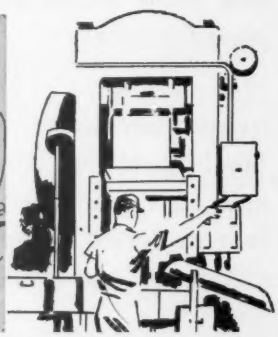


TUBE DRAWING

WIRE DRAWING



COLD HEADING



IMPACT EXTRUSION

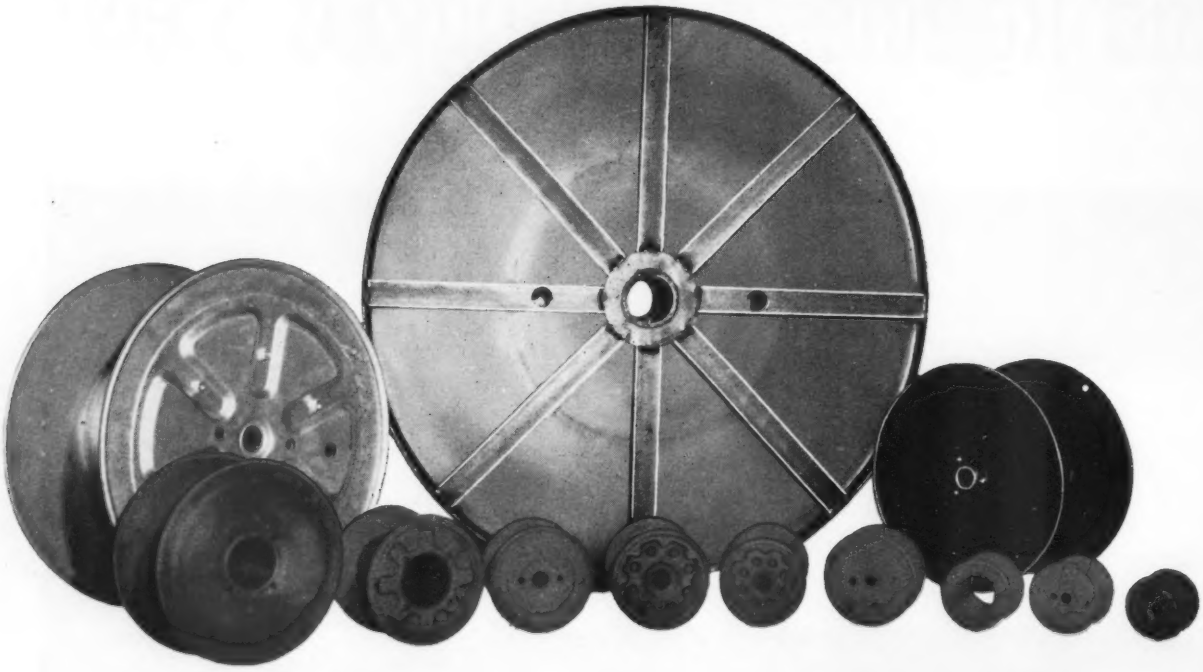
Write for your copy of Bulletin 1437 on Granodraw processes, and further information on Serseal—two of the many Amchem chemicals for the metalworking industry.

AMCHEM GRANODRAW SS

Amchem, Granodraw and Serseal are registered trademarks of
AMCHEM PRODUCTS, INC. (Formerly American Chemical Paint Co.)
AMBLER, PA. • Detroit, Mich. • St. Joseph, Mo. • Niles, Calif.

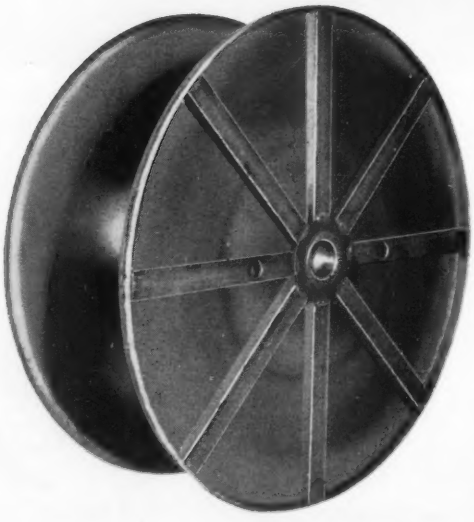
Steel SPOOLS and REELS?

Yes, We Make Them!



Many types and constructions of Steel Spools and Reels for Shipping and Shop use in plain, painted or plated finishes.

In addition to our standard sizes of Steel Spools, we also have facilities and equipment for producing custom designed Spools and Reels to customers' specifications.



HUBBARD SPOOL DIVISION
Van Norman Industries, Inc.

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BUY FROM REEL HEADQUARTERS - HUBBARD. ALL MATERIALS AND TYPES

The Wire Outlook

We are witnessing the anomaly of having bell-wether steel in the doldrums, while business otherwise is generally good.

The industry has been operating at around half of its capacity, albeit it has risen to some 55 percent in the last few weeks and further moderate increases are foreseen by industry leaders.

Yet taking the 1947 index of 100 as a guide, that of 1950 was 111.9, for 1955 it was 129.4, and in 1959 it reached 148.8. It is stated that at 70 percent of capacity all the normal needs of the country could be supplied — indicating that expansion and modernization projects have produced a capacity that will serve for some years to come. The lack of a more active demand in the face of widespread good business has the economists guessing. Probably unused inventories, the unsettled price situation and imports all bear on the problem.

Retail trade is showing great liveliness, including appliances, radios, TV sets and phonographs. Building was more brisk than usual during the summer and auto sales have been good, with upwards of six million cars expected to be moved during the year. 1961 models already are rolling off the assembly lines.

Steel executives look for an output of 70 percent before the year is out. Brass mills have cut prices on many items and anticipate sales increases in the second half. Paralleling this, it is reported that imports also have been down of late.

In the electric wire field, the shading of prices by a major manufacturer by 6 to 12 percent has caused much consternation in independent magnet wire circles. Many are unable to trim prices by that much and are finding orders drying up because buyers are holding off for cuts all along the line.

Little encouragement to wire mills on tariff hikes to preserve our fencing and nail business has come out of the voluminous testimony before the Tariff Commission, who have declared that wire imports are not in sufficient volume to cause serious damage to domestic producers. On top of this, United Steelworkers Union officials have scoffed at foreign competition as a factor in the decline of steel operations and jobs.

Merchant wire product orders have improved seasonally somewhat through the summer, although imports still hurt. Construction wire product sales have been better as a result of greater building activity. Largely, the demand for wire has remained about the same in recent months — very quiet.

A returning visitor to leading European wire mills gathered the impression that a number of them have achieved a higher degree of efficiency than our best. There is greater use of automated equipment and less help in some of them. If this be true, it would pay our wire people to do some checking.

A word of warning! Business **will** be affected by the election outcome. The Democratic platform is strictly socialistic — a declaration of avowed intent to establish a welfare state. Under it, Federal spending would be drastically increased, bureaucratic powers would be extended and taxes would have to be increased, denials to the contrary. The platform, if carried out, is a master plan for ending prosperity and destroying the freedom of the people. Bureaus will be poking their long noses to a greater extent than ever into personal affairs to regulate jobs, wages, prices, education, business, homes, etc. It is not honest, if taken at its face value. It assuredly is not American. Do we want to have our resources and affairs regulated according to some bureaucrats' notion of our needs?

It might be well also to bear in mind that under every Democratic administration in recent decades our country has gone to war. The involvements and internal mess that would result from the effectuation of the demagogic promises of the aspiring "outs" could very well lead to another — this time a catastrophic world-wide conflict. It is only fair to say that they don't plan it that way, but it could be a highly probable result.

In November the electorate will choose between a free economy and a welfare state. May the people vote wisely!

Edmund D. Sickels

EDITOR

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Design for Cold Heading

by

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Mr. Smith has prepared a treatise on cold heading particularly stressing the problems encountered in cold forming fasteners of different types of metals.

What Cold Heading Is

Cold heading is a high speed automatic process for forming heads and collars on wire and rod stock by shaping the metal cold between dies. It is widely used in the production of nails, rivets, screw blanks, and thousands of miscellaneous components. Stated another way, cold heading is a process wherein unheated metal is deformed beyond its elastic limit to take a permanent set to the particular shape desired. Cold heading also is referred to as cold forming, cold upsetting, and cold forging.

* * *

Almost any organization which fastens one part to another or which manufacturers products in quantity, can benefit from cold heading. The designer often can reduce costs and improve design by recognizing those places where cold headed parts can be applied.

How It's Done

Most cold-headed items are made from cold drawn wire. The wire is supported on a reel in front of the machine (Fig. 1) and passes into it through straighteners and feed rolls, coming to rest against a stop. In most cases the wire is then sheared to size and formed.

Fig. 1. General view of cold heading machine. Machine is being set up and operator is checking headed part. Headed parts will be collected in tray beneath discharge chute. * * * *

* * *

There are two basic types of cold-heading machines, the "solid die" and "open die" types.

* * *

The solid die header uses a cylindrical block (Fig. 2) with an axial hole through its center. A "knock-out pin" extends partially into the hole from the rear. A blank is automatically cut and pushed into the open end of the hole until it is stopped by the "knock-out pin." A portion of the blank extends beyond the die and is hit by a heading punch. In a single-blow machine this completes the forming operation and the knock-out pin advances, ejecting the part. In forming larger heads and collars the blank is struck by two or more punches before being completed.

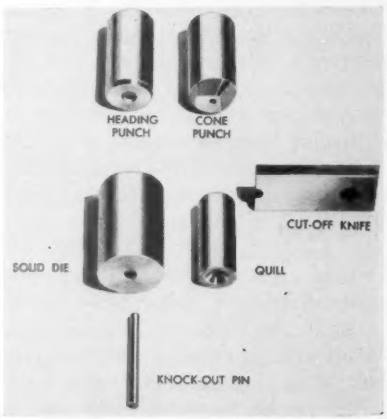

Fig. 2. Solid die. Cut-off knife and quill sever wire and position blank in front of die hole. Cone punch oscillates into striking position, pushes the blank slug into the hole as far as it will go, partially forms the protruding portion into a cone shape, and retracts. As it oscillates out of position, the heading punch oscillates into position and strikes the partially formed blank to complete the upset. As the heading punch retracts, the knock-out rejects the part and the cycle repeats. * * * *

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The open die header uses a pair of identical blocks (Fig. 3) with mating grooves which form an axial hole when the two matching faces are put together. Wire feeds

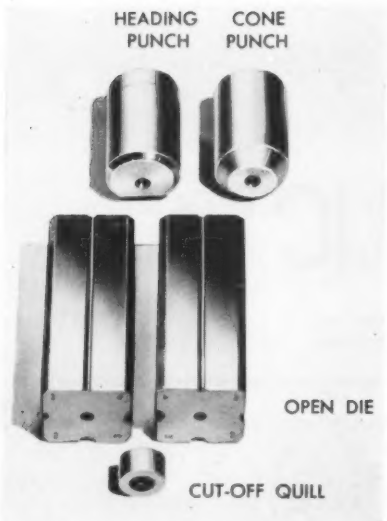

Fig. 3. Open dies. Wire feeds between separated mating grooves, is gripped as die blocks close, and protruding end is headed as in the solid die machine. Dies part to release headed part. Four different parts of the same length can be made with one pair of die blocks. * *

into the parted hole and comes to rest with a portion extending beyond the forward ends of the dies. The dies now come together, clamping the wire, which is then normally sheared by a lateral movement of the dies. The extended portion of wire is formed into the head or collar, as in the case of a solid die. The dies then separate allowing the headed piece to fall clear.

* * *

This procedure varies slightly in making nails and related items, in that the head is formed prior to shearing. Then, after the head has been formed, the dies open wide enough to permit the wire to travel forward, and when it has advanced a predetermined amount, the headed part is sheared off at a point which leaves a portion of stock extending beyond the ends of the dies for the next heading cycle. Nail points are formed in the cut-off process.

* * *

The head can be formed: (1) in a cavity in the punch, (2) in a cavity in the body die (3) in cavities of both, or (4) between the dies. See Fig 4. The cold heading operation takes place at great speed and parts are made at rates up to 400 per minute.

Comparison With Other Methods

The two metalworking processes

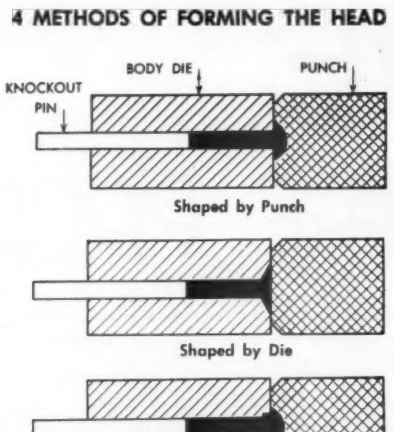

Fig. 4. The four methods or forming the head or collar. * * * * * * * * * *

most closely associated with cold heading are hot heading and screw machining. Each method is clearly advantageous for given types of work although there are overlapping areas where an item might be produced by more than one method.

* * *

In general, cold heading is the preferred process when large quantities are desired and when raw-material diameter does not exceed one inch. Hot heading is most applicable for heading bar stock one inch or more in diameter and where particularly large heads are desired. In such cases, it is desirable to heat the metal before heading. Automatic screw machines can sometimes produce smaller lot sizes more economically than cold heading since dies are not required, although there is a tooling cost which must be considered.

* * *

There are certain shapes which naturally are best made by a given process. For example, parts having non-symmetrical offsets frequently can readily be headed but not machined. On the other hand certain necked parts can be made on screw machines but not on cold headers. Items such as socket wrenches would be made on hot headers due to the relatively large hollow heads.

* * *

In contrasting cold heading with hot heading, cold heading does not require that the metal be heated, there is no scale problem, a good finish is produced, and tolerances are closer. In comparison with machining, cold heading produces virtually no waste whereas machining turns down bar stock from the largest to smallest diameter, thereby producing considerable waste material (Fig. 5). Also, with cold heading flow lines follow the contour of the upset and produce a stronger part than does machining which cuts across these lines. In addition, cold heading machines inherently produce at a faster rate than do screw machines.

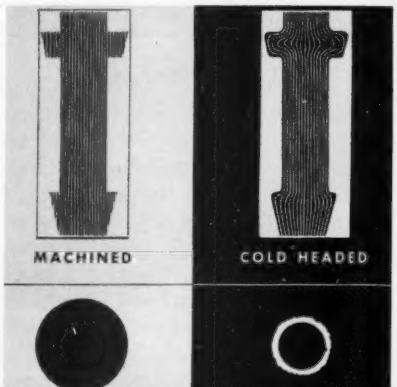

Fig. 5. Cold heading produces virtually no scrap whereas machining turns down bar stock resulting in substantial waste material. Also, grain structures of cold-headed parts follow contours of upsets and result in increased structural strength. * * * * * * * *

Quantities and Cost

Lot sizes at which the economic advantages of cold heading may be obtained vary with the part, the crux of the matter being that sufficient parts must be required to justify the cost of making dies. In some cases, when the die is easily made, as few as five thousand parts may be an economical lot size. However, generally several times this number must be required before the process becomes economically competitive.

* * *

Whenever parts can be made by cold heading and volume warrants,

this process is invariably less expensive than other methods. No furnace man is required, parts are not individually handled, there is virtually no waste and production rates are high.

Materials

The range of metals which can be cold headed is extremely broad and the designer should have no difficulty in obtaining cold headed parts of the same metal as major components of the design item.

* * *

In general, ductile metals are best suited for cold heading since they flow easier and result in a minimum of die wear. However, where less ductile metals are required they usually can be cold headed but at a slightly higher die cost. Besides the carbon steels, both nickel chrome and straight chrome stainless steels are cold headed in great quantity. Most non-ferrous metals, including copper, brass, nickel silver and Monel among others can be successfully upset. Aluminum and aluminum alloys cold head easily and are being used in greater volume as more uses are being found for these metals.

* * *

Silver, platinum and gold are often specified for instrument and jewelry parts and rivets have been cold headed from commercially pure titanium wire.

* * *

The Industrial Fasteners Institute has set up a system of 20 material grades for the designer's convenience. This system includes seven steels, three stainless steels, four copper alloys, three aluminum alloys, and three nickel alloys. Practically any combination of end properties can be satisfied with at least one of these twenty grades. A discussion of each of the twenty grades follows.

1. Steels

All carbon steels with carbon content too low to permit a marked response to heat treatment are considered low carbon steels. These steels are easily headed, have relatively good strength properties that can be substantially improved by cold working, and they can be case hardened, to provide a wear-resistant surface.

* * *

Medium carbon steels respond to a quench-and-temper heat treatment. Heat treated medium carbon steel represents the most strength per dollar attainable from any known metal. Medium carbon steels are fairly easily cold worked but, as the carbon content increases, their headability decreases.

* * *

Alloy steels are manufactured with small quantities of alloying elements, such as silicon, molybdenum, nickel, vanadium, chromium, and boron, added to improve hardenability, strength, toughness, resistance to loss of strength at high temperatures, or to offset brittleness at low temperatures. Depending upon the alloy selected, any of these properties, simply or combined, may be achieved. After heat treatment, alloy steels offer a much greater factor of safety and uniformity than carbon steels. However, the alloys make them more expensive, and more difficult to process.

a. SAE Grade 0 steel

This grade is used to make parts for which there are no physical requirements. It may be case hardened if wear resistance or surface hardness are required.

b. Low carbon steel — SAE Grade 1

This is a low carbon steel with a tensile strength of 55,000 psi. Cold heading hardens and strengthens it.

* * *

If the upset is unusually large, a stress relief heat treatment is usually necessary to reduce the brittleness caused by the cold working.

* * *

This grade is suitable for case hardening where wear resistance or surface hardness is required.

c. Low carbon steel — SAE Grade 2

This is low carbon steel similar to SAE Grade 1, but with recognition of the higher physical properties in the smaller diameters and lengths attained by cold working in heading.

* * *

Heat treating for stress relief is frequently desirable, depending upon end use of the product.

* * *

This grade also is suitable for case hardening where wear resistance or surface hardness is required.

d. Medium carbon steel — SAE Grade 3

This grade is on the low side of the medium carbon steel area. It has a minimum tensile strength of 90,000 psi, and cold working induces this high strength without subsequent heat treatment.

e. Medium carbon steel, quenched and tempered — SAE Grade 5

This grade is a medium carbon steel, quenched and tempered to produce high strength properties. Its minimum tensile strength ranges from 120,00 to 90,000 psi, depending on the size of the part. When strength alone is the prime consideration in the design, this grade will usually be found the most economical to use. Its relatively high hardness level also permits its use when the part is subject to wear in combination with high stress.

f. Alloy steel quenched and tempered — SAE Grade 8

This is a low alloy steel, quenched and tempered to produce a tensile strength of 150,000 psi. Although its strength is somewhat superior to that of SAE Grade 5, this advantage of extra strength is offset by added material cost as well as more difficult processing. Therefore, this grade is used only when some other property, such as toughness, high hardness, or resistance to loss of strength in elevated temperatures, is required.

g. Low carbon steel, annealed

This is a low carbon steel, annealed to reduce its hardness level below Rockwell B60. It is suited for small rivets, special pins, or other parts that must be soft

enough to be staked, bent, riveted, or deformed in some other manner during assembly.

2. Stainless Steels

Stainless steels may be broadly defined as ferrous alloys containing from 12 to 30 per cent of chromium and 0 to 20 per cent of nickel. This basic analysis is further modified by the addition of carbon and other alloying elements, which contribute specific effects, either to control mechanical properties or to improve corrosion resistance.

* * *

The outstanding characteristic of stainless steels is their ability to form on their surface a thin, invisible film of chromium oxide, which acts as a protection against corrosion of the underlying metal. Stainless steels also have exceptional resistance to scaling and oxidation at high temperatures, due also to this protective film. This film possesses remarkable stability, toughness, and ability to adhere at all temperature ranges. In general, stainless steels have high strength properties, which may or may not be improved by heat treatment, depending upon the analysis.

a. Stainless steel, 12% chromium

This is a chromium stainless steel of the martensitic type. It has a tensile strength in the annealed condition of 80,000 psi, and it may be heat treated to higher strength characteristics. It is magnetic in all conditions of heat treatment, has good heading qualities, and offers good corrosion resistance in mild atmospheres, although for maximum corrosion resistance it must be annealed.

b. Stainless steel, 17% chromium

This is a chromium stainless steel with a tensile strength in the annealed condition of 75,000 psi. It hardens during cold working, but will not respond to heat treatment. It is magnetic, and has excellent heading qualities. It is widely used where corrosion resistance requirements are not too severe, although for maximum corrosion resistance it must be annealed.

c. Stainless steel, 18% chromium, 8% nickel

This grade is commonly referred to as "18-8 Stainless." It has a tensile strength in the annealed condition of 75,000 psi and it retains good strength craracteristics at elevated temperatures. Its corrosion resistance is superior in comparison with other stainless steels, but it also must be annealed for best performance under severe corrosive conditions. It is nonmagnetic in the annealed stage, but may be slightly magnetic in the as-fabricated state. It work hardens rapidly when cold headed and will not respond to normal heat treatments.

3. Copper and Copper Alloys

Copper ranks next to steel in commercial importance. It is alloyed with zinc to form brass, and with hardening elements such as tin, slilicon, manganese, etc. to form bronzes. Copper and its alloys possess excellent heading properties, toughness, resiliency to withstand shock, excellent corrosion resistance in most atmospheres, good electrical and thermal conductivity, are non-magnetic, and will take and maintain a fine, highly-polished finish. None of the brasses or bronzes can be heat treated, although their hardness and strength properties are improved considerably by cold working. To eliminate embrittlement and increase corrosion resistance in the presence of high stress, it often is necessary to stress relieve parts after cold heading.

a. Commercially pure copper

The principal useful characteristic of commercially pure copper is its high electrical conductivity which, volume for volume, is second only to silver. It has good corrosion resistance, excellent toughness, good heading qualities, and an as-fabricated tensile strength of 32,000 psi.

b. Commercial Bronze

Although it is commonly known as commercial bronze because of its bronze color, this alloy actually is a brass, composed of 90 per cent copper and 10 per cent zinc. It has a tensile strength of 45,000 psi, reasonably good electrical conductivity, is readily cold worked, and possesses good corrosion resistance. Like copper, it is not subject to "season cracking," a spontaneous failure of stressed material after considerable time in a corrosive environment. This characteristic is prevalent in brasses with less than 80 per cent copper content.

c. Heading Brass

This brass contains from 65 to 70 per cent copper and 35 to 30 per cent zinc. It has a tensile strength of 45,000 psi, good corrosion resistance, pleasing yellow color, and reasonably good electrical conductivity. This is the most widely used brass in the heading industry, possibly because it offers the most favorable compromise between economy and useful service characteristics.

d. Silicon Bronze

Silicon bronze contains about 96 per cent copper, 1.5 to 3.75 per cent silicon, and one or more other element, such as zinc, manganese, tin or iron. It has a tensile strength, as-fabricated, of 70,000 psi and, as-annealed, of 56,000 psi. Its electrical conductivity is not as good as other copper alloys, although its corrosion resistance is exceptionlly good in most atmospheres. It has good heading qualities.

4. Aluminum and Aluminum Alloys

On a volume basis, aluminum, because of its light weight, is the leading non-ferrous metal in use today. Light weight is its most important property, being about one-third that of steel and three-tenths that of copper. Pure aluminum has relatively low strength, but it may be strengthened considerably by alloying. Many of its alloys may be further improved by heat treatment as well as by cold working. Its electrical conductivity is excellent. It ranks close to copper in thermal conductivity but, because of its relatively low melting point, is not suitable for high temperature applications.

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Aluminum and its alloys possess good corrosion resistance in general, although they are subject to attack in some atmospheres. Aluminum has good heading qualities, is non-magnetic, and will take and maintain a highly polished finish.

a. Commercially pure aluminum

Because of its low strength — 13,000 psi — commercially pure aluminum is not very widely used. However, its very softness makes it suitable for headed parts that must be staked, riveted, peened, or otherwise formed in assembly. It has excellent heading properties.

b. Aluminum, 17S or equivalent

This grade is an aluminum alloy with the principal alloying elements being copper, manganese, and magnesium. It can be heat treated, and in its T4 condition, it has a tensile strength of 62,000 psi. It has very good cold heading qualities.

c. Aluminum, 24S or equivalent

This aluminum alloy is a modification of 17S with the alloying elements slightly increased. In T4 condition it has a tensile strength of 68,000 psi, and this increase in strength is obtained without sacrificing its good heading qualities.

5. Nickel and Nickel Alloys

In many respects, the properties of nickel resemble those of iron, except that nickel has excellent corrosion resistance in practically all corrosive environments. In general, the properties of nickel and its alloys are superior to those of other non-ferrous alloys, but their higher cost limits their use to those applications suited to their special high-grade properties. The combination of its high strength and good heat resistance make nickel and its alloys some of the best materials for use in elevated temperatures. Nickel is magnetic up to about 660F, but above this temperature it becomes non-magnetic. It is relatively scarce and sometimes difficult to obtain.

a. Commercially pure Nickel

Commercially pure nickel (99.4% minimum) has a tensile strength of 68,000 psi. Because of its purity, it does not respond effectively to heat treatment. It has good cold heading properties.

b. Monel

This is a nickel alloy, commercially known as Monel, composed of approximately 67 per cent nickel, 30 per cent copper, and small quantities of iron and manganese. It has an annealed tensile strength of 75,000 psi, is slightly magnetic at room temperature, but loses its magnetism when heated.

c. Inconel

This is a nickel alloy composed of approximately 77 per cent nickel, 15 per cent chromium, and 7 per cent iron, with a tensile strength in the annealed condition of 80,000 psi. It is an outstanding material for parts that must retain their strength and resist oxidation at temperatures ranging up to 1600F. It is nonmagnetic and difficult to cold head.

Specifying the Material

In specifying the material, one of the foregoing grades will generally meet end-use requirements. If none does, however, the designer may specify the grade most nearly corresponding to that needed and then qualify it by listing those special or slightly different properties needed. When requirements are of such a special nature that none of these grades approximate what is needed, it is recommended that the producer be consulted for his opinion. He has many years of experience which can be called upon to help select the most applicable and economical material for the job.

* * *

In addition to the grade of material, such additional information as hardness range, tensile strength, surface hardness(if case hardened), or any other special property required to assure proper functioning of the part should be specified.

Effect of Cold Heading On Materials

Since cold heading forces metal into new shapes by plastic flow, the properties of the metal are altered in the direction of increasing strength and brittleness. The degree to which a material is thus work hardened depends upon the material and upon the upset.

* * *

The extent to which annealing is required to relieve stresses caused by work hardening depends upon the end use of the item and upon the material being used. Some materials (see section under materials) should almost always be annealed, others would never be annealed, and some would be annealed depending upon the end use of the product. In this latter connection, the cold header can be relied upon in deciding whether annealing is required. If there is any doubt, parts should be annealed, the extra cost per part being minor.

* * *

As previously stated, the metallurgical characteristics of the cold headed part are superior to those of machined parts since flow lines of the cold headed part tend to follow the direction of the upset, whereas those of the machined part are cut. The degree to which a cold headed part is stronger depends upon the material and the shape of the finished part. However, roughly speaking, cold headed parts might be expected to be 10 to 15% stronger.

Sizes and Shapes

In practice, heading machines readily produce parts having shank diameters from about .024″ to about 1″, and lengths from a minimum of around 1/16″ to 7″. Figs. 6 and 7 show typical examples of both large and small cold headed parts.

* * *

The shape of most cold headed items can be traced to a shank section with one or two upsets in the form of heads, collars, or odd shapes such as wings, offsets, crank shapes, etc.

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Cold heading is often combined with secondary operations to further extend the range of items which may be produced by this method. Some of these secondary

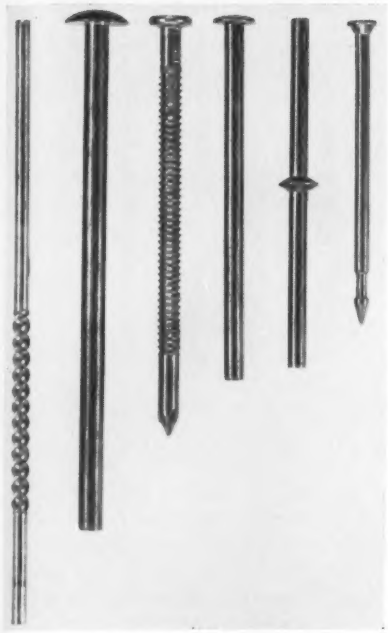

Fig. 6. Group of long cold headed parts. * *

Fig. 7. Group of small cold headed parts. *

operations are: bending, broaching, drilling, flattening, polishing, plating, slitting, trimming, tapping, threading, swedging, milling, grinding, fluting, knurling, etc.

* * *

In making cold headed parts, as a rule of thumb, whenever the length of the portion of the blank to be upset is less than 2½ times the wire diameter the part is made in a single blow header. However, when an effort is made to upset a greater amount in one blow, the wire does not upset uniformly and two or more blows are required. Most parts are made in two blows, the first gathering the metal into a conical upset, the second blow continuing the graduated flow of metal into the final head. See Fig. 8. Thus, "cold shuts" or faults are avoided and the superior strength

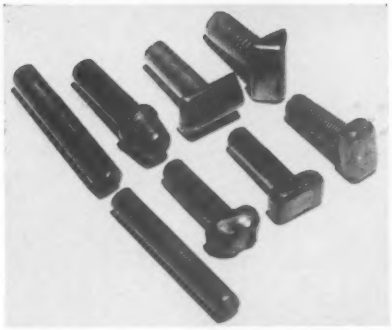

Fig. 8. Two bolts made in two blow headers. Blank is sheared to size, struck by the coning punch, then by the heading punch. Headed blank is threaded in secondary operation. *

characteristics of cold heading are preserved.

* * *

When the length of wire required to form the head is in the vicinity of 4½ to 7 times the diameter, three blows are required (Fig. 9), and when the length of wire required to form the head is 7 times the diameter or larger, four blows are needed.

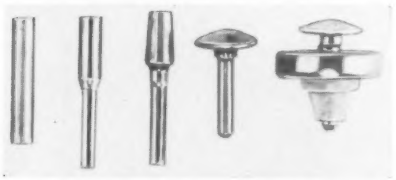

Fig. 9. Component for aerosol bottlecap made in three steps on progressive header in which blank indexes through three stations for sequential heading blows. * * * * * *

In applying multiple blows, the blank may be held in the original body die for all blows, may be automatically transferred to other body dies for the subsequent blows or, may be taken to a second machine for subsequent blows.

* * *

When two blows are required, a two-blow header is used and the striking arm of this machine has two heading dies (Figs. 2 and 3) which oscillate in and out of position as parts are made. In forming a new blank, the arm moves forward with the coning die in position to hit and partially form the stock. As the arm retracts, the coning die oscillates out of position and the heading die moves into position to complete the forming operation. The cycle then repeats upon introduction of the next blank.

* * *

When three blows are required, a progressive header is used and parts index from one body die to the next for subsequent blows. With each stroke of the machine, a new blank is partially formed in the first die, the partially finished blank in the second die is further completed, and the part in the third body die is completed. As the finished part is ejected, the partially finished parts in dies one and two move up to dies two and three, respectively, and a new blank is fed to die one.

* * *

When a part requires more than three blows, it is partially completed in one machine and then transferred to another for subsequent blows. In this case, the work usually is annealed before going to the second machine, since it will have cooled and should be stress relieved prior to further working. Also, since the parts are now independent pieces, they are hopper fed into the machine via feed rails.

* * *

When a part is to have two upsets (Fig. 10), one may be formed in one sequence of operations and the second may be formed in a second set of operations. In some cases, where the double heads are symmetrical (Fig. 11), they may be formed simultaneously on a special open die machine in which both ends of the blank extend beyond the die ends and are struck simultaneously by a punch at each end of the body dies.

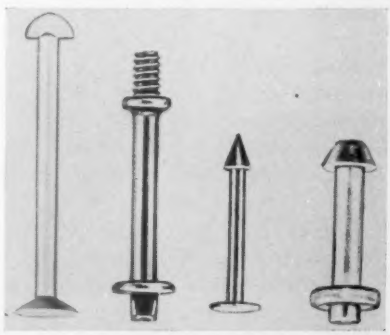

Fig. 10. When parts have two upsets, one is formed in one heading operation, the other in a second, or re-heading, operation. * * *

To a certain extent cold heading is empirical in nature, being learned after years of experience and involving a "knack" for "feeling" of how a part can best be made both from technical and economical viewpoints. Therefore it

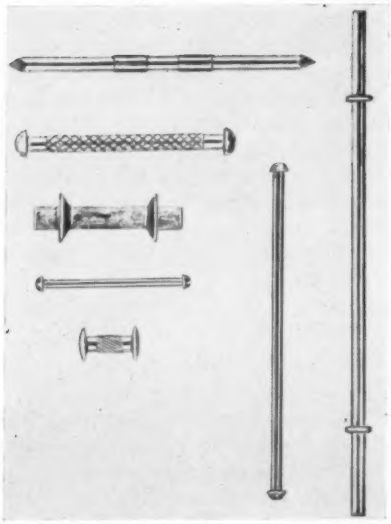

Fig. 11. In some cases, when a part is to have two identical upsets, they can be produced simultaneously. * * * * * * * * * *

is desirable to discuss the part with a manufacturer before freezing the design. The manufacturer frequently can suggest simple design modifications which will materially simplify manufacturing with resultant cost reductions. The changes are usually easily made if brought to attention before the design is finalized.

Tolerances

As is good design always, tolerances should not be specified greater than are required since they increase cost by decreasing die life. Actually, the only justifiable tolerances are those which, if exceeded, render the part unusable.

* * *

Cold heading can produce to commercial standards and where close tolerances are necessary, carbide dies can be used to maintain these tolerances over long runs.

* * *

Fig. 12 indicates tolerance ranges for varying shank diameters. Type 1 tolerances are held easily on most production machines; they should be specified whenever possible as they are by far the most economical to meet. When closer tolerances are required Type 2 may be specified. These generally may be held on production headers, although some sizes and shapes may require secondary finishing operations. Type 3 tolerances should be considered only if necessary and will require secondary operations.

Nominal Shank Diameter Inches	Tolerance Ranges Inches		
	Type 1	Type 2	Type 3
1/16 through 3/16	.008	.004	.002
1/4	.010	.005	.0025
5/16	.012	.006	.003
3/8	.013	.006	.003
7/16 and 1/2	.015	.007	.0035
9/16 and 5/8	.017	.008	.004
3/4	.018	.009	.0045
7/8	.020	.009	.0045
1	.022	.010	.005

Fig. 12. Tolerance ranges for varying shank diameters. Type 1 are held easly, Type 2 may generally be held, Type 3 require secondary finishing operations. * * * * * * * *

* * *

Head tolerances are difficult to define because they vary with the style of the head. Fig. 13, however, indicates tolerance ranges for height and diameter of upsets made from shanks of diameters indicated.

Nominal Shank Diameter Inches	Tolerance Ranges	
	For Upset Height Inches	For Upset Diameter Inches
1/16	.008	.014
1/8	.010	.018
3/16	.012	.021
1/4	.014	.025
5/16	.015	.029
3/8	.017	.032
7/16	.019	.036
1/2	.021	.040
5/8	.025	.048
3/4	.028	.055
7/8	.032	.062
1	.036	.070

Fig. 13. Tolerance ranges for height and diameter of upsets made from shanks of diameters as indicated. * * * * * * * * * *

Fig. 14, indicates tolerance ranges on lengths. The length of a headed part, incidentally, is taken as the distance from the extreme end to the largest diameter of the upset portion.

For Diameters Up to and Including 3/4"	
For Lengths	Tolerance Range
Up to 1"	1/32"
Over 1" to 2"	1/16"
Over 2" to 6"	3/32"
Over 6"	3/16"
For Diameters Over 3/4"	
For Lengths	Tolerance Range
Up to 1"	1/16"
Over 1" to 2"	3/32"
Over 2"	3/16"

Fig. 14. Tolerance ranges on length. * * *

Finish

Cold formed parts have a smooth, bright, burnished surface, formed in drawing the wire and in the heading operation. This finish is attractive and generally no further processing is required.

Designing for Production

In designing for production, the simpler the part the less it will cost, both from the points of view of dies and machine time. Efforts also should be made to design for the fewest number of blows.

* * *

The designer also should endeavor to visualize the production of parts by combined cold-heading and secondary operations. Parts which can be so made are usually less expensive than when made by other methods.

* * *

There are also a number of miscellaneous design factors which can frequently be used to advantage. Some of these are discussed below.

a. Extrusion

Cold heading may be used to reduce a section of wire to a smaller diameter by forcing the material into a die opening of smaller size. The lead-in wire diameter section of the die hole tapers to meet the smaller-diameter section of the hole. Extrusion by cold heading results in a saving of material and in production time compared with such methods as turning, grinding, and milling. The amount of reduction by extrusion should not exceed approximately 20% of the original wire diameter. To be produced by cold heading the part must have a taper of approximately 14° connecting the extruded section with the larger-diameter portion of the shank.

b. Fillets

It is recommended that parts have fillets where upset joins shank and that they have a radius of approximately 10 to 13% of wire diameter. Rounded corners and fillets not only are simpler to cold head, but also permit smoother transfer of stresses, and

(*Please turn to page* 1134)

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FASTEST..... automatic single stroke action
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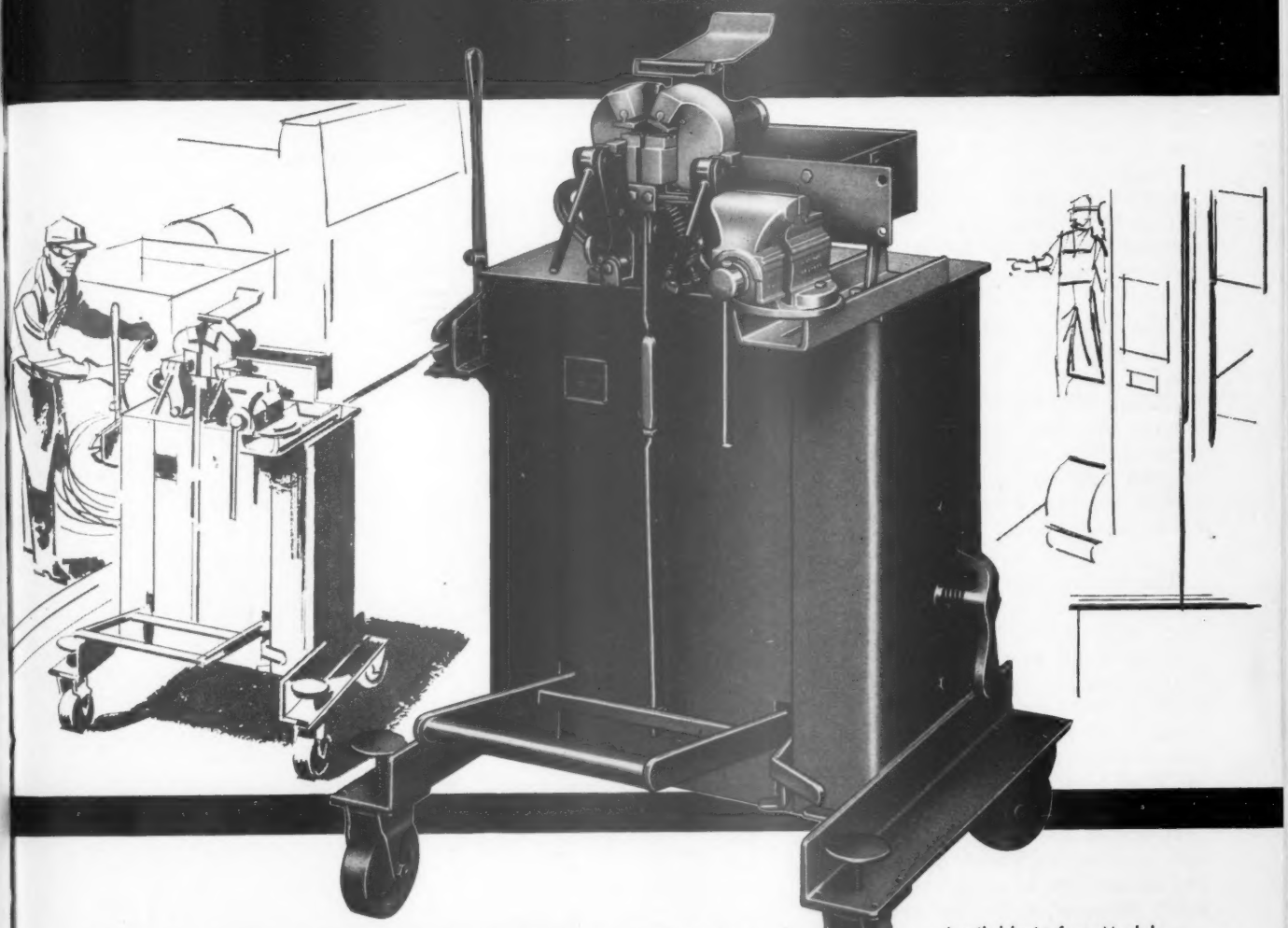

MODEL "J" TYPE AUTOMATIC MICROWELD BUTT WELDER FOR NON-FERROUS WIRE AND ROD

The welding cycle on these units is automatically completed by one single downward stroke of the foot pedal, which clamps the stock being welded, contacts the welding switch, and applies the spring upset pressure on the weld.

All welders are equipped with annealing dies, filing vise, hand shears, and mounted on 4-wheel truck.

Available in four Models —

MODEL J-45-C .080" to .204" Dia.	**MODEL J-5-C** .128" to .257" Dia.
MODEL J-7-C .187" to .375" Dia.	**MODEL J-8-C** .250" to .500" Dia.

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Wire Speed Calculations for Extrusion Machines

by William J. Owens
Engineer — Manufacturing Standards
Wire and Cable Department
General Electric Company
Bridgeport, Connecticut

In the planning for new wire extrusion machinery and in the production loading of established equipment there is a frequent need for a means of rapidly determining the wire or cable output in feet per minute for a large range of sizes and types based on the potential output of the machinery and on the volume output in cubic feet per hour for the insulating or jacketing material.

* * *

This output varies on the basis of the particular machine, its extrusion screw characteristics and RPM and upon the compound itself where the specific gravity and other physical characteristics such as plasticity and temperature establish a value of actual output in cubic feet per hour.

* * *

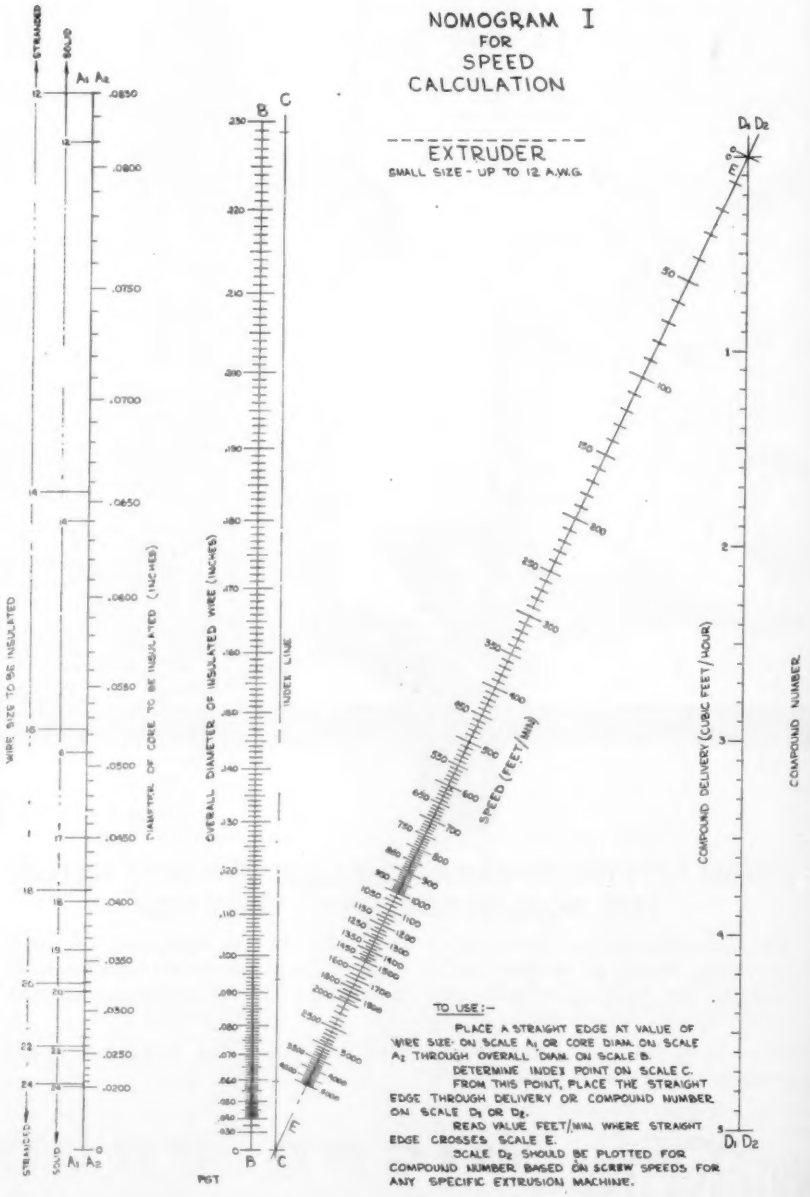
The four nomograms shown provide this rapid means of calculation, with Nomogram I covering sizes up to 12 Awg or .0830″ core, Nomogram II sizes up to 6 Awg solid or .162″ core, Nomogram III sizes up to 4/0 Awg or .550″ core and Nomogram IV sizes up to 2000 MCM or 1.620″ core.

* * *

It should be noted that on the left hand scale of each nomogram the calibration A_1 gives values for solid, stranded and rope stranded conductors as marked. In the case of the solid conductor the size corresponds with the actual core size for that diameter, but in the case of the stranded or rope stranded conductors the value reflects the equivalent diameter, that is, it takes into account not only the true diameter of the wire but the diameter factor resulting from the material used to fill the interstices of the strand and in all cases is somewhat less than the actual value. These values are based on Class B concentric stranding and Class G rope stranding.

* * *

Scale A_2 gives direct readings for core diameter which are presumed to be round and without interstices.


NOMOGRAM I
FOR
SPEED
CALCULATION
EXTRUDER
SMALL SIZE - UP TO 12 A.W.G.
STRANDED
SOLID
A1 A2
WIRE SIZES TO BE INSULATED
DIAMETER OF CORE TO BE INSULATED (INCHES)
B
C
OVERALL DIAMETER OF INSULATED WIRE (INCHES)
INDEX LINE
E
PST
D1 D2
SPEED (FEET/MIN)
COMPOUND DELIVERY (CUBIC FEET/HOUR)
COMPOUND NUMBER
TO USE:-
PLACE A STRAIGHT EDGE AT VALUE OF WIRE SIZE ON SCALE A1 OR CORE DIAM. ON SCALE A2 THROUGH OVERALL DIAM. ON SCALE B.
DETERMINE INDEX POINT ON SCALE C.
FROM THIS POINT, PLACE THE STRAIGHT EDGE THROUGH DELIVERY OR COMPOUND NUMBER ON SCALE D1 OR D2.
READ VALUE FEET/MIN. WHERE STRAIGHT EDGE CROSSES SCALE E.
SCALE D2 SHOULD BE PLOTTED FOR COMPOUND NUMBER BASED ON SCREW SPEEDS FOR ANY SPECIFIC EXTRUSION MACHINE.

The scale B is calibrated to the diameter values for round insulation or jacket covering.

* * *

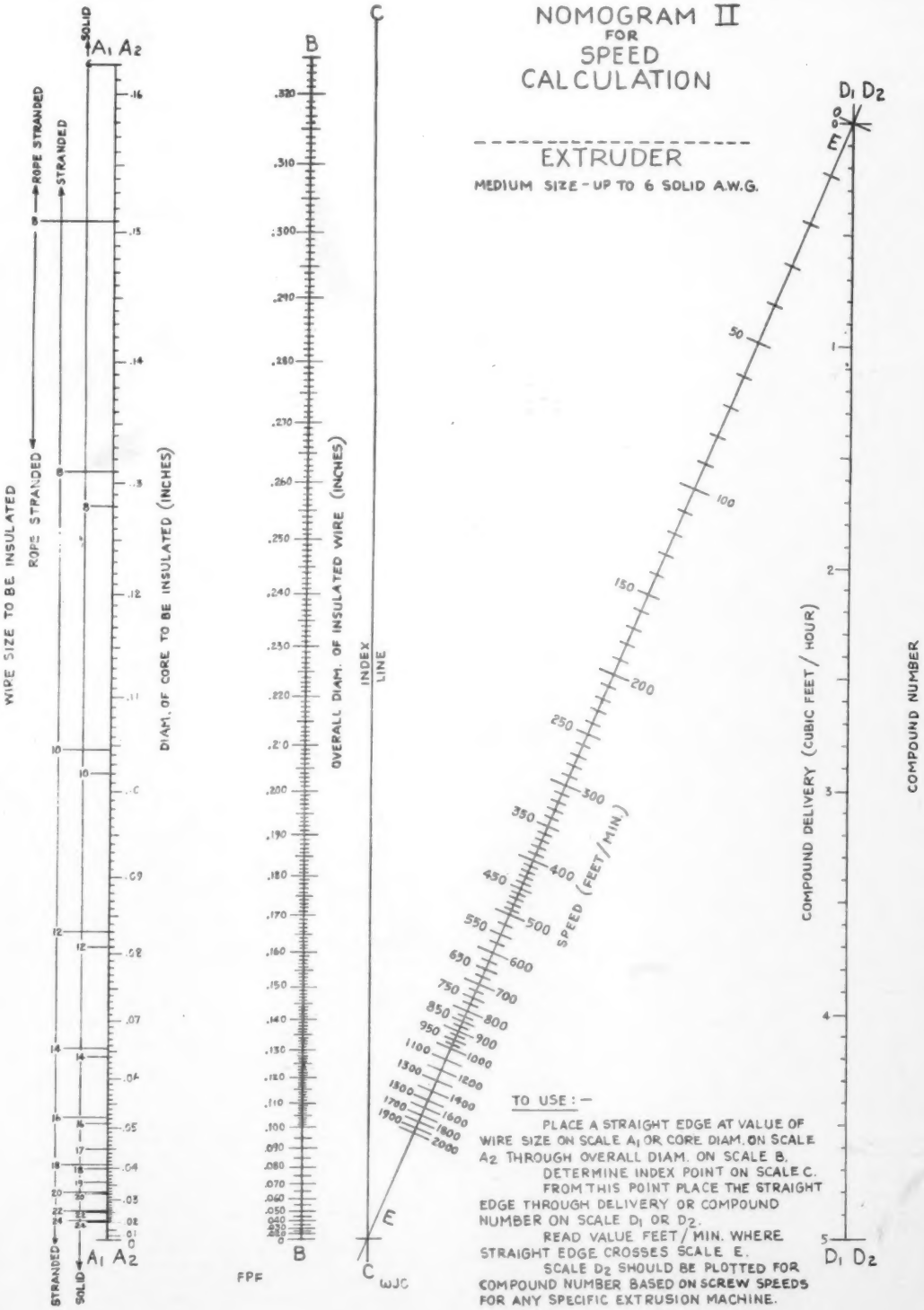
Scale D_1 is calibrated for actual compound delivery or output in cubic feet per hour and Scale D_2 is provided to add cubic feet per hour markings for specific compounds, at specific screw speeds, for a specific extruder.

* * *

The unknown value of wire speed in feet per minute is read on Scale E.

* * *

Nomograms may be used to plot values for conditions existing in each machine and for every applicable compound and screw speed. In this way, the nomograms shown


NOMOGRAM II
FOR
SPEED
CALCULATION
EXTRUDER
MEDIUM SIZE - UP TO 6 SOLID A.W.G.
WIRE SIZE TO BE INSULATED
ROPE STRANDED
STRANDED
SOLID
A1 A2
DIAM. OF CORE TO BE INSULATED (INCHES)
OVERALL DIAM. OF INSULATED WIRE (INCHES)
INDEX LINE
SPEED (FEET/MIN.)
COMPOUND DELIVERY (CUBIC FEET / HOUR)
COMPOUND NUMBER
D1 D2
E
B
C
FPF
WJC
TO USE:—
PLACE A STRAIGHT EDGE AT VALUE OF WIRE SIZE ON SCALE A1 OR CORE DIAM. ON SCALE A2 THROUGH OVERALL DIAM. ON SCALE B.
DETERMINE INDEX POINT ON SCALE C.
FROM THIS POINT PLACE THE STRAIGHT EDGE THROUGH DELIVERY OR COMPOUND NUMBER ON SCALE D1 OR D2.
READ VALUE FEET/MIN. WHERE STRAIGHT EDGE CROSSES SCALE E.
SCALE D2 SHOULD BE PLOTTED FOR COMPOUND NUMBER BASED ON SCREW SPEEDS FOR ANY SPECIFIC EXTRUSION MACHINE.

serve as "blanks" for the plotting of specific information for individual machines or groups of machines.

* * *

The plot is based on the following formula:

$$S = 3.06 \frac{C}{(D^2 - d^2)}$$

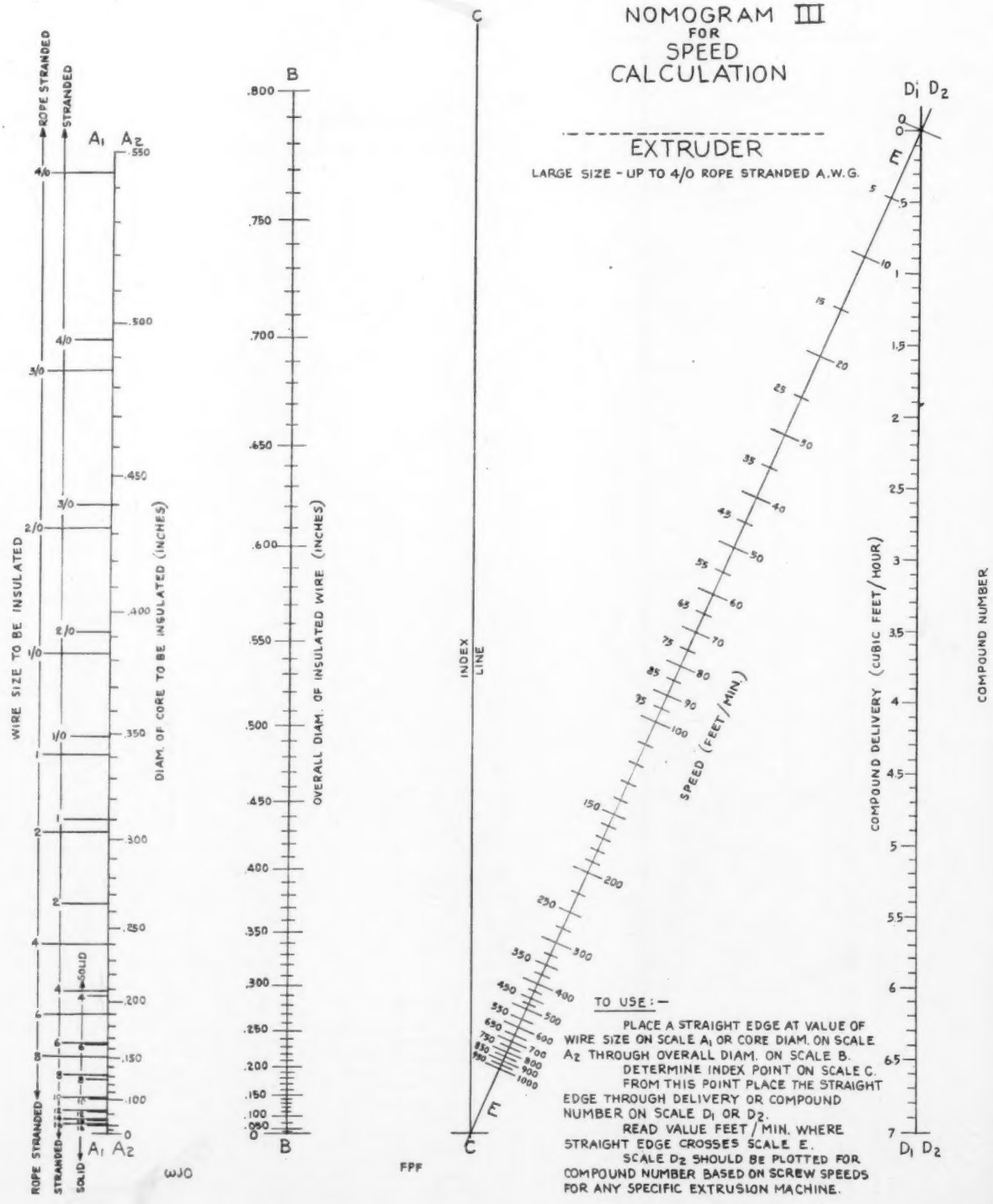
where S = Wire speed in feet per minute.

C = Compound Delivery Rate in cubic feet per hour.

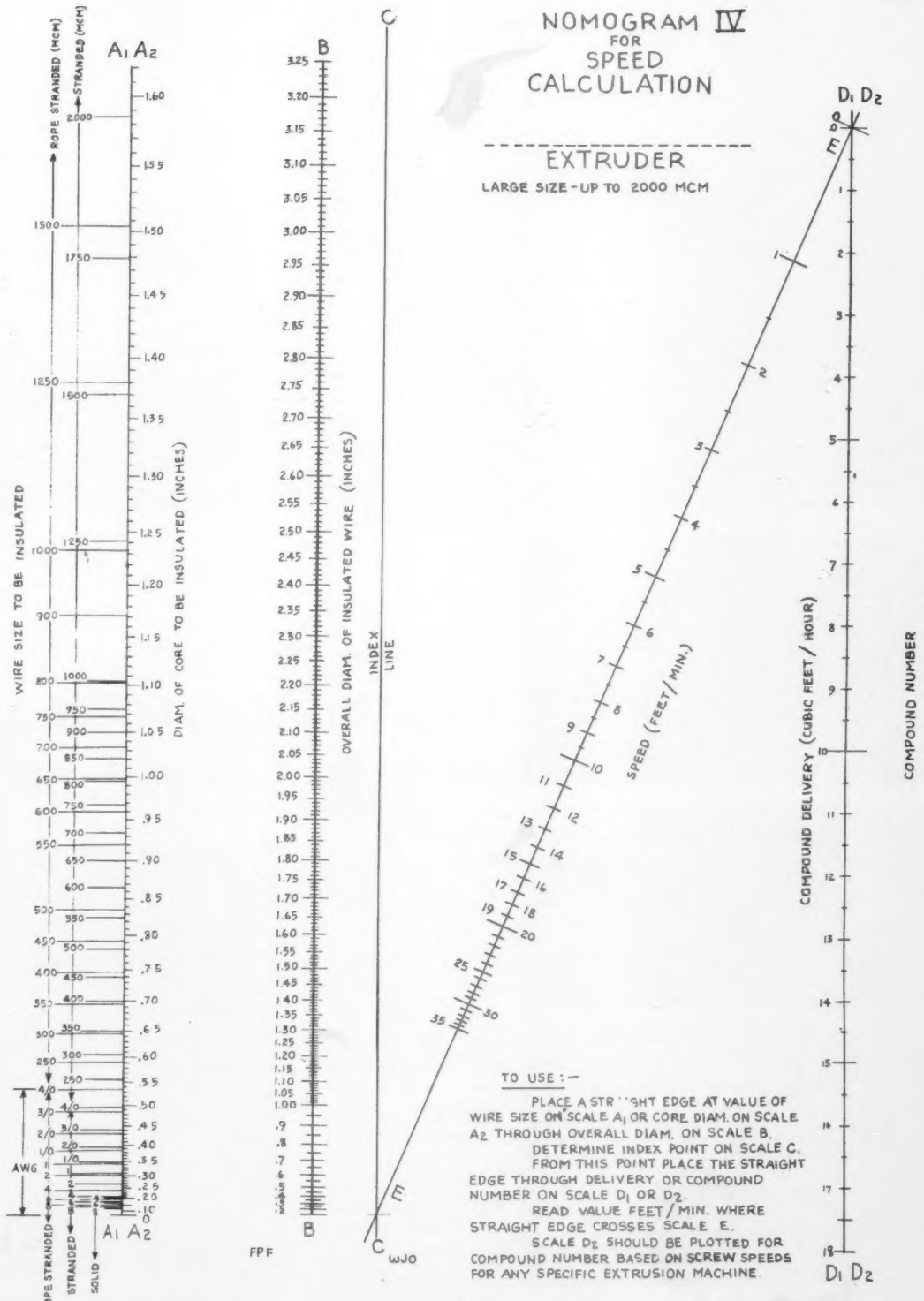
D = Overall diameter of insulated or jacketed wire in inches.

d = Diameter or equivalent diameter of core in inches.

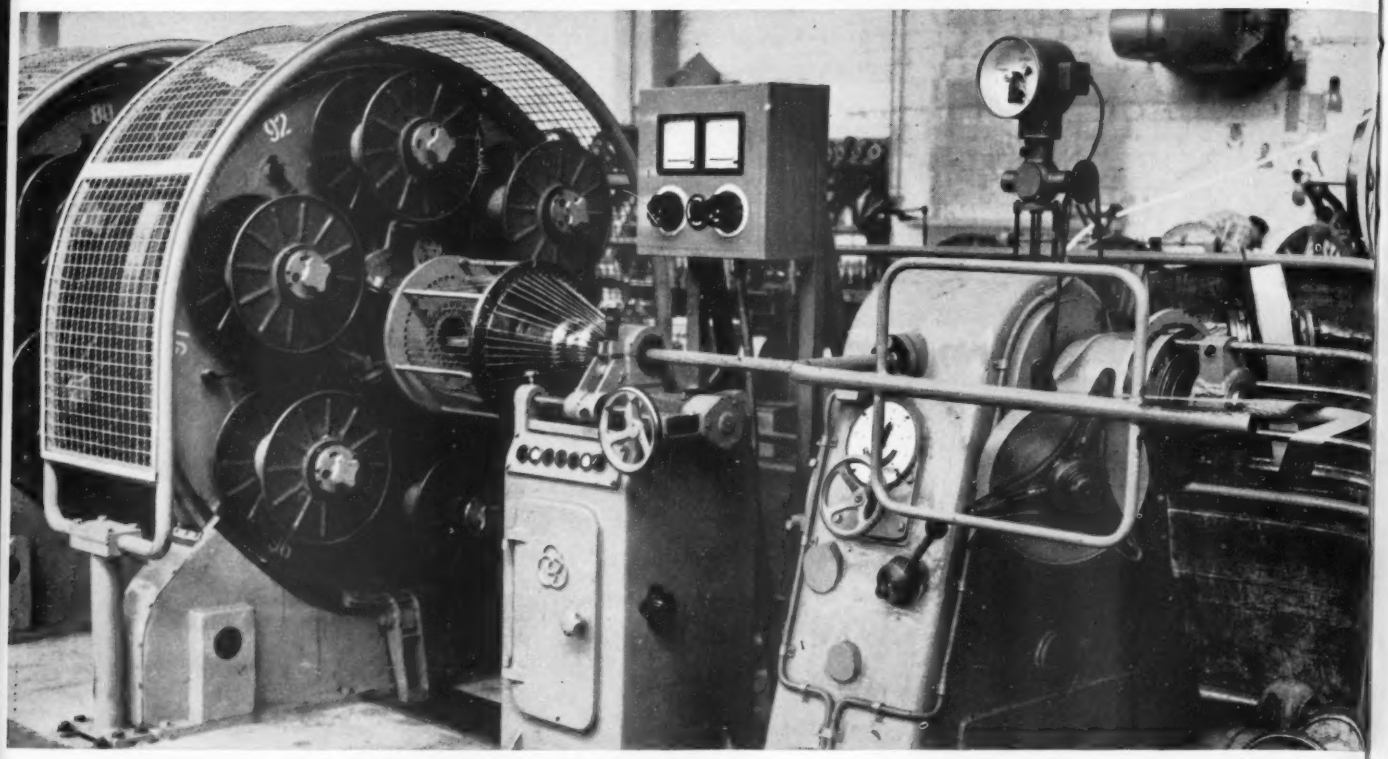
(See following page For Nomogram IV)

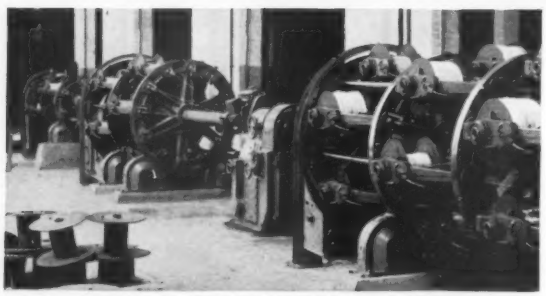

NOMOGRAM III
FOR
SPEED
CALCULATION
EXTRUDER
LARGE SIZE - UP TO 4/0 ROPE STRANDED A.W.G.
ROPE STRANDED
STRANDED
SOLID
WIRE SIZE TO BE INSULATED
DIAM. OF CORE TO BE INSULATED (INCHES)
OVERALL DIAM. OF INSULATED WIRE (INCHES)
INDEX LINE
SPEED (FEET/MIN.)
COMPOUND DELIVERY (CUBIC FEET/HOUR)
COMPOUND NUMBER
TO USE:—
PLACE A STRAIGHT EDGE AT VALUE OF WIRE SIZE ON SCALE A1 OR CORE DIAM. ON SCALE A2 THROUGH OVERALL DIAM. ON SCALE B.
DETERMINE INDEX POINT ON SCALE C.
FROM THIS POINT PLACE THE STRAIGHT EDGE THROUGH DELIVERY OR COMPOUND NUMBER ON SCALE D1 OR D2.
READ VALUE FEET / MIN. WHERE STRAIGHT EDGE CROSSES SCALE E.
SCALE D2 SHOULD BE PLOTTED FOR COMPOUND NUMBER BASED ON SCREW SPEEDS FOR ANY SPECIFIC EXTRUSION MACHINE.
WJO
FPF

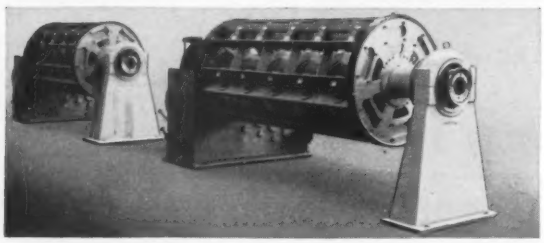
(See text on preceding pages for explanation)

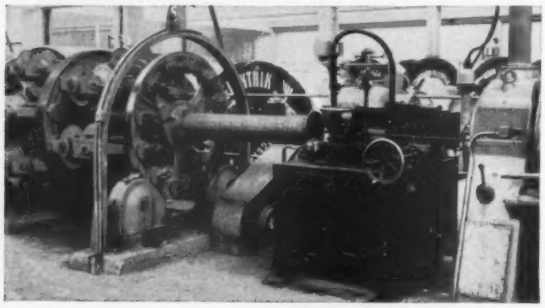

NOMOGRAM IV
FOR
SPEED
CALCULATION
EXTRUDER
LARGE SIZE - UP TO 2000 MCM
ROPE STRANDED (MCM)
STRANDED (MCM)
A1 A2
WIRE SIZE TO BE INSULATED
DIAM. OF CORE TO BE INSULATED (INCHES)
AWG
ROPE STRANDED
STRANDED
SOLID
B
OVERALL DIAM. OF INSULATED WIRE (INCHES)
INDEX LINE
C
FPF
ωJO
E
SPEED (FEET / MIN.)
D1 D2
COMPOUND DELIVERY (CUBIC FEET / HOUR)
COMPOUND NUMBER
TO USE :—
PLACE A STRAIGHT EDGE AT VALUE OF WIRE SIZE ON SCALE A1 OR CORE DIAM. ON SCALE A2 THROUGH OVERALL DIAM. ON SCALE B.
DETERMINE INDEX POINT ON SCALE C.
FROM THIS POINT PLACE THE STRAIGHT EDGE THROUGH DELIVERY OR COMPOUND NUMBER ON SCALE D1 OR D2.
READ VALUE FEET / MIN. WHERE STRAIGHT EDGE CROSSES SCALE E.
SCALE D2 SHOULD BE PLOTTED FOR COMPOUND NUMBER BASED ON SCREW SPEEDS FOR ANY SPECIFIC EXTRUSION MACHINE.

KRUPP









Cage Stranding Machines for Power Cables

Top:
Rigid Strander, parallel arrangement

Left, top:
Planetary Strander

Left, center:
Rigid Strander Cage, tangential arrangement

Left, bottom:
Planetary wire armoring machine

FRIED. KRUPP MASCHINEN- UND STAHLBAU RHEINHAUSEN

For information, please contact Krupp International Inc., 375 Park Avenue, New York 22 N. Y.

Precision Cable Manufacture Improved with New Type Reels

by A. W. Levenhagen, President
Molded Fiber Glass Tray Company
Linesville, Pennsylvania

A case history account of some problems in cable manufacture and their solution

One of the nation's largest manufacturers of electrical cables solved a serious production problem by the use of molded fiber glass reels.

* * *

The wire and cable producer had found that as its production of instrumentation cables increased in recent years for the electronics industry, new production techniques and equipment were required.

* * *

Instrumentation cables — used for telemetering, data recording, circuit control testing and electronic computers — require wires of smaller diameters and longer lengths than some of the more traditional products, such as street lighting cables, signal cables, power cables and industrial feeder cables.

* * *

Demands for reliability in the instrumentation cable field call for near perfection in component parts. Often conventional product lines just won't fill the bill. Special skills, experience and materials are needed to produce the wire and cables used, for instance, in the nation's guided missiles. Much of the data evaluation, metering testing and controlling equipment depends on cables made by this manufacturer. But the demands for precise manufacture and extreme reliability found this company ready with the necessary know-how and manufacturing equipment. One production problem, however, resulted from the smaller diameters and the longer lengths required for wires used in instrumentation cables.

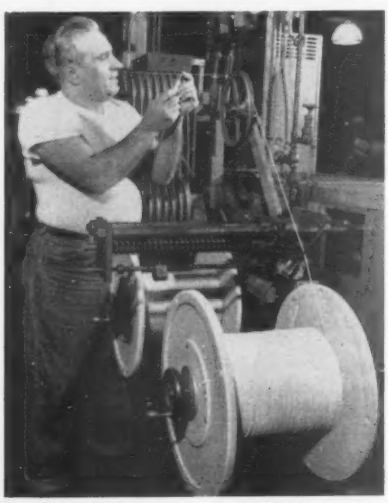


Fig. 1. A molded fiber glass take-up reel in a wire insulating line. * * * * * * *

Fig. 2. Cabling machine in which glass reinforced plastic bobbins are used. * * * *

* * *

This was the problem solved by molded fiber glass in the form of reels made of the reinforced plastic material.

* * *

Formerly, steel reels were used exclusively in the various production processes which take wire through insulating, striping, braiding, cabling and testing. But as production of instrumention cables increased, it was apparent that steel reels were giving an unsatisfactory performance when used with smaller wires.

Breakage from pile-ups and dented flanges, occasional rust and uneven traversing all were laid to the door of steel reels. Maintenance of reels was tedious and expensive.

* * *

Then the company's packaging manager heard about a new type of Toteline reel made of molded fiber glass, which didn't rust, splinter, dent or bend.

* * *

This new plastic reel, which happens to have been developed and produced by our company, is made of a combination of fiber glass and polyester resins. Obtaining two sample reels for testing, the cable producer found claims made for the new reels were well founded. On the cabling machines where insulated conductors — with the required fillers and binders — are twisted together to form a cable assembly, up to 37 reels are rotated in a planetary cabler at high speeds. As the drum revolves to give the twisting effect, wires are paid off the reels.

* * *

After testing these molded fiber glass reels, the cable company purchased 200 reels with flanges 16 inches in diameter and drums 10 inches wide. When these reels

(*Please turn to page* 1181)

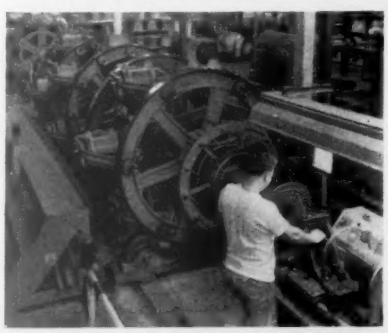


Fig. 3. Wardwell braiding machines applying a two color identification braid on wire that is taken up on Toteline reels. The wire then is lacquered before the cabling operation. * *

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Product Development Metallurgist
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Pittsburgh Steel Co.
Pittsburgh, Pa.

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Rod & Wire Mills
Bethlehem Steel Co.
Sparrows Point, Md.

D. D. BUCHANAN, Manager of Operations
Union Drawn Steel Div.
Republic Steel Corp.
Massillon, Ohio

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Indiana Steel & Wire Co.
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JOHN A. MORITZ, Supt., Wire Mill
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L. C. WHITNEY, Mgr. Dev. Eng.
Copperweld Steel Co.
Glassport, Pa.

TOM M. GIRDLER, JR., Div. Mgr.
Union Drawn Steel Div.
Republic Steel Corp
Massillon, Ohio

Titles and connections of Past Presidents are those at the time each held office.

The Wire Association is a non-profit organization of wire mill executives, superintendents and foremen. It also includes plant engineers, traffic men, and all others engaged in the production of cold drawn bars, rods, wire, strip, insulated wire and cable, and the manufacture and fabrication of finished wire products, including cold headed, extruded and other cold worked metal products.

There are separate divisions for all the various major interests in the wire industry, steel, iron, brass, copper, alloy, and precious metals, together with divisions relating to drawing, cold working, cold heading, extruding, fabricating, forming, spring making, wire cloth, wire rope, bare and covered electric wire and cable and all other forms of wire and wire products.

ACTIVITIES

The Association functions along the following lines:

1. The use of the Association headquarters as a central clearing house for information and data of all kinds which may be of interest to members.
2. The exchange of ideas on processes of production including machinery, technical processes, etc.
3. The establishment and maintenance of friendly relations among the members of the association and the development of sectional and national meetings to discuss matters of mutual interest.
4. Studies of production methods and analysis of production costs.
5. Developments in the use of new materials and new applications of existing materials and by-products.
6. Research and collection of information on personnel management, including such factors as labor turnover, seasonal changes in the demand for employees, wage scales, etc.
7. Production simplification as a means for the effective elimination of waste.
8. Such other subjects as may be determined upon.

THE MORDICA MEMORIAL LECTURE

An invitation to deliver the Mordica Memorial Lecture is considered the highest honor within the power of the Board of Directors of The Wire Association to bestow upon a member.

The lecturer is selected each year by the Board of Past Presidents on the basis of outstanding contributions to the wire industry.

The 1960 Mordica Memorial Lecture will be delivered by DARTREY LEWIS, Chief Engineer, Research & Development, John A. Roebling's Sons Div., The Colorado Fuel & Iron Corporation, Trenton, N. J. His subject will be: "PLASTIC COATED STEEL WIRE."

THE ANNUAL MEDAL AWARDS

Every year a bronze Medal is presented to an author in each of the Association's divisions—Ferrous and Non-Ferrous—for those papers that come nearest to the requirements set forth herein. Honorable mention Certificates are also awarded. These awards are presented during the Annual Convention of The Wire Association. The medals and certificates are accompanied by cash awards of $100.00 and $50.00 respectively.

* * *

Consideration for such awards is not limited to papers presented at Association meetings, but to all papers submitted by members as a contribution to The Wire Association and published in WIRE AND WIRE PRODUCTS.

* * *

All papers submitted become the property of The Wire Association and are assigned to WIRE AND WIRE PRODUCTS for copyrighting and evclusive publication.

* * *

Awards, you will note, are a recognition of a definite contribution to the advancement of the interests of the Wire Industry.

* * *

Selection of papers for awards rests in the hands of the Association's Committee on Awards, which is headed by a director of The Wire Association.

REQUIREMENTS FOR CONSIDERATION OF PAPERS

The first consideration of eligibility is that the author or authors must be Association members. A second is that it must be a contribution to the Association or to WIRE AND WIRE PRODUCTS, as articles for which the magazine has paid an honorarium cannot be considered. A third is that any paper that has been previously presented before another society or published in another magazine cannot be taken under advisement for awards.

* * *

JUDGING PAPERS

Papers eligible for awards are judged by the Oxford System, which is considered the best one so far devised for the impersonal determination of the worthwhileness of papers. Consideration is given to the following points, among others:

1. Value of the paper to The Wire Association's members as a whole.
2. Does it contain new information that has not been published hitherto, or is it merely a restatement of research material?
3. Does it constitute an advancement in knowledge by clarification of past information?
4. Does it provide a re-assessment of known facts in such manned as to be readily understood by the industry as a whole?
5. Are the claims in the paper factually supported with definite, impartial test data and established experience?
6. Is the paper valuable as a reference work?

All members of The Wire Association are cordially invited to submit technical papers either for publication in "WIRE & WIRE PRODUCTS" during the year or for presentation before the Annual Convention or the Regional Meetings.

THE TWENTY-FIVE YEAR CERTIFICATES

These certificates of The Wire Association are presented each year by the Board of Directors to those who have been members continuously for 25 years. The 1960 recipients are:

JOSEPH C. BARTLETT, Pres.
The Bartlett Hair-Spring Co.
North Haven, Conn

WALTER D. BRONSON, Pres.
Bronson & Bratton, Inc.
Chicago, Ill.

TAYLOR CORNELIUS, Asst. Gen. Mgr.
Aluminum Company of Canada, Ltd.
Montreal, Que., Canada

EMIL DERN, Treas.
Kelly Wire Die Corp.
New York, N. Y.

GEORGE E. DONALD, Pres.
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JOHN H. FRIEDMAN, Chm. of Bd.
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Phillips Electrical Co., Ltd.
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Worcester, Mass.

RICHARD NEUHAUS, Chm. Bd. of Dr.
Nukem Products Corp.
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ARTHUR M. REEDER, Met. Eng.
Jones & Laughlin Steel Corp.
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LEROY D. SEYMOUR, Pres.
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Trenton, N. J.

VAN DORN C. SMITH, Sales Dept.
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CHESTER F. WICKWIRE, Pres.
Wickwire Brothers, Inc.
Cortland, N. Y.

ROBERT C. WILLIAMS, V.P.-Res.
The Ironsides Co.
Columbus, Ohio

Subjects to be Covered in the Technical Sessions at the ANNUAL CONVENTION of the WIRE ASSOCIATION

November 14-17, 1960, La Salle Hotel, Chicago, Ill.

MORDICA MEMORIAL LECTURE: Plastic Coated Steel Wire

FERROUS PROGRAM

Mechanical Descaling — Dies, Lubricants, etc.
Phosphate Coatings, Extrusion, Cold Heading and Wire Drawing
Methods for Setting Incentive Rates
Planning and Scheduling in a Wire Mill
Dies for Drawing Coated Wire
Fine Wire Packaging and Dead Blocks
Blast Cleaning vs Batch Pickling
Stream Pollution
A New Weld Wire Machine
Cold Extrusion
The Theory of Wire Straightening
Plant Inspection Tour of Republic Steel's Wire Mill

NON-FERROUS PROGRAM

Heat Treatment of Wire
Carbon Block Brazing of Stranded and Solid Copper Wire
Copper Rod and Wire Mill Scrap and Losses
Gasses in Metals
Fabrication of QMV Beryllium Copper Wire
Controlled Distortion of Wire
Some Factors Influencing the Performance of Non-Ferrous Wire Drawing Lubricants
Modern Developments in the Control of High Speed Low Tension Reeling Equipment
Abrasives and Their Use as Applied to Wire Drawing Dies
Some Observations on Copper Alloy Extrusions
Properties and Applications of Some Specialty Wires
Resistance Annealing

ELECTRIC WIRE AND CABLE PROGRAM

Syncronized Extruder-Capstan Drives for High Speed Insulation Lines
Application of Enamel Coverings to Rectangular Copper Sections in the Manufacture of Continuously Transposed Conductors
Color Applications for the Wire and Cable Industry
Vertical CV
Aluminum Sheath for Cables by Direct Extrusion
Casting and Rolling of EC Aluminum Rod
Effects of Environmental Conditions on Dissipation Factor and Dielectric Constant of Very Low-Loss Polyethylene Compounds
Moisture Control in Plastics Preceding Extrusion for Wire and Cable
Tinsel Conductor Manufacture
Catenary CV
History of Extrusion Equipment for Rubber and Plastics
Vinyl Plastisol—A versatile Material for Insulating Wire and Encapsulating Wire Harness Constructions
Ethylene Copolymers for Insulating Wire

The foregoing paper lists are tentative and not final. More complete lists will be published later.

MAKE YOUR PLANS NOW TO ATTEND THE CONVENTION

THE WIRE ASSOCIATION

453 MAIN STREET **RICHARD E. BROWN, Executive Secretary** **STAMFORD, CONN.**

Wire Testing by Ultrasonics

by

Dr. W. Lehfeldt

This article, which appeared in the March, 1960, issue of Draht-Welt, was translated by Jerome W. Howe of Worcester, Massachusetts. It describes a new technique that makes possible the detection of internal flaws in wire. The author is with the firm of Dr. Lehfeldt Co., G.m.b.H., Heppenheim a.d.B.

The non-destructive testing of metallic materials by means of ultrasonics today has become common technical practice. Steel rails, forgings, welded joints in tanks and pipes, heavily loaded parts of machines or sheets in general are tested by ultrasonics.

* * *

Only wire has thus far resisted all attempts of such testing. The reason is easy to see. It lies in the geometry of the wire and also in the geometry of the defects to be disclosed by such tests, so that the process of ultrasonic testing up to now has had to be rejected. By a single testing, foreign inclusions as well as cracks lengthwise and across the wire have to be discovered with the greatest possible sensitivity and, of course, with a relatively high testing speed. That it has now been found possible, using the following closely described testing method, to identify the above-mentioned sources of defect, and indeed with a speed of up to 1 meter per second (197 ft./min.), represents an important step forward. Indications also are that this velocity can be appreciably raised.

* * *

As is known, two different methods of ultrasonic testing are available: the irradiation method and the impulse-echo method. It should be mentioned at the outset that neither longitudinal nor transverse waves, that are used in conventional manner for the testing of any part, are useful for the testing of wire by the impulse-echo method. This negative statement must here suffice; detailed explanations would become too involved for this article.

* * *

In the past, many attempts have been made by the author and his collaborators as well as in other quarters, to make the irradiation method useful in wire testing. Thus in earlier years in various quarters testing apparatus was suggested which, with two separated sound-heads, irradiate the wire lengthwise and test by the irradiation method. The sound coupling was done with metal or plastic plugs of various forms which, either dry or lightly oiled, touched the wire that was drawn through for lengthwise testing. However, by this form of sound coupling the testing speed was very limited, so that with very painstaking procedure and frequent readjustment of the apparatus, testing speeds of only a few centimeters per second could be achieved. In addition, the consistency of test results from such low testing speed left much to be desired, and consequently this kind of testing was never utilized.

* * *

Further attempts to improve decisively the sound coupling by the addition of a fluid at the place of contact of the sounder with the wire, remained without result; and indeed since it is unavoidable that after the passing of the first sound-head, little drops of liquid travel along with the wire in irregular sequence, which results in a variable damping of the ultrasonic waves on their path of propagation along the wire between the two sound-heads. In this way the oscillations originating from the sound couplings were eliminated; however, oscillations of the sound propagation, at least as strongly disturbing, were emitted in the faultless wire as a result of this method of coupling. Parenthetically it should be remarked also that blasting with compressed air or the use of felt washers for wiping off the liquid made hardly any improvement. It finally was determined that it was impracticable to use the irradiation method with sufficient accuracy in wire testing to justify its employment.

* * *

The extensive development work of the author's collaborator, chief engineer **H. W. Bande,** in the field of plate testing, showed a new way, further pursuit of which allows it to be used advantageously in wire testing. In testing plates with flat waves the radiating is done, as is well known, at a specific angle dependent upon frequency and plate thickness, which alone will set going the flat waves in the plate. So the testing of very thin sheets, if for example of only 0.1 mm (0.004 in.) thickness, was made possible by the impulse-echo method, as the flat waves reflected defects of whatever kind in the sheet, and also defects that were, for example, as distant from the sound-head as one meter (3¼ ft.) were still plainly visible as pulses on the fluorescent screen of the oscilloscope. With longitudinal or transverse waves however, as is well known, a testing of thin sheets was just as impossible by the impulse-echo method as the testing of wire.

* * *

As the next step then, liquid sound-heads were used in the sheet testing, as is shown schematically in Fig. 1. The sound transducer itself was set inside a tank filled

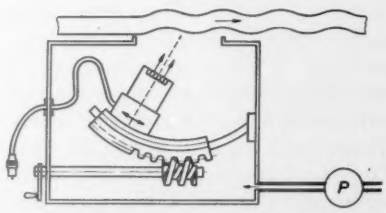

Fig. 1 — Diagram of a liquid ultrasonic head for projecting flat waves in plates, with adjustable injection angle. * * * * * * * *

with liquid arranged below the test piece, with a small circular opening in the cover. By the operation of a pump, a continuous flow of liquid through the opening is effected, which forms there a small "hill of liquid" that, almost without contact, effects the sound coupling to the piece under test, which is drawn over with a constant separation of, for example, only 0.5 mm (0.002 in.) above the opening. The sound transducer itself is arranged for pivoting and in such manner that the pivot is in the middle of the opening, so that by any angle of injection the sound ray passes exactly through it. By adjustment to the correct angle, flat waves are set going in the piece under test, which have the characteristic that, in consequence of the resonance condition in the sheet, they spread out with the least damping through a testing range of one to two meters.

* * *

Meanwhile, in quite analogous fashion to this demonstrated testing method, experiments on wire testing were carried on. In place of the flat waves, here there were resonance vibrations in the wire, which for simplicity will be termed "wire waves." For the mathematically minded reader, the theoretical basis of this kind of vibrations will be explained in a later article. Here it will suffice to advise, respecting this, that in a rod-like body (with round cross-section) torsional vibrations as well as bending or longitudinal vibrations are possible. The flat waves first mentioned are composed only of bending and longitudinal vibrations. With a given testing frequency the wave length of this kind of vibrations is dependent upon the diameter and material of the rod.

* * *

If longitudinal waves are radiated in a wedge in an adjustable angle obliquely against this rod (see Fig. 2) the above-mentioned resonance vibrations then are set going only if the wedge angle shown in the figure is so set that the hypothenuse 1 (length of wire wave) and the side L (longitudinal wave-length in the wedge) form with the subtending angle α of the

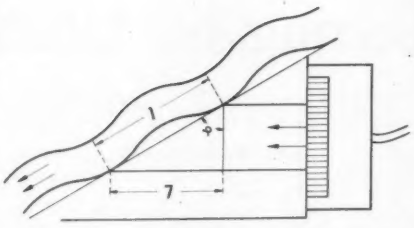

Fig. 2 — Phase condition for setting up flat waves. The wave-length L of the longitudinal waves in the wedge must be somewhat shorter than the flat wave-length 1 in the plate. The right-angled triangle formed by both determines the injection angle α. * * * * * * *

wedge a right-angled triangle. If these phase conditions are not fulfilled, then the wire wave of the frequency, as the sound-head emits it, will not be set going; the resonance condition for setting such a wire wave in motion is not then fulfilled. If, however, the wire wave is set in motion, then this travels away from the sound-head along the direction of the wire or rod as a resonance vibration with very little damping. By this means the whole cross-section of the wire participates equally in the energy propagation. In practice the use of a liquid wedge is recommended, with the arrangement of the sound transducer under the wire similar to that shown in Fig. 1.

* * *

The resonance condition for the diffusion of such a wire wave is only fulfilled to the extent that the wire itself is free from defects. Even a very slight crack in whatever direction relative to the axis of the wire disturbs sensitively the resonance condition and occasions at least a partial reflection of this wire wave. The reflected wave then travels back from the defect to the sound-head, is there received, and can be evaluated or made visible by an impulse-echo receiver.

* * *

By this means the possibility exists that permits an ultrasonic impulse to travel through the wire parallel to the axis and thus make the well-known impulse-echo method available for wire testing. At this point it should be particularly pointed out that with the frequency 4 MHz, wire waves of this kind have been very well propagated in steel wire of from 0.1 to 5 mm thickness (0.004 to 0.2 in.). It is believed that in steel and in most of the alloys for wire, the sound velocity lies between 5 and 6,000 m/sec. (longitudinal wave velocity); the wave length for the longitudinal wave by 4 MHz is therefore 1.25 to 1.5 mm. The wave-length for transverse waves is in general about half as large. In the wire, zig-zag reflected longitudinal or transverse waves will set up a complicated interference field that makes the testing impossible. That is the result when the wave-length is of the same order of magnitude as the wire diameter or even greater. Through research, however, it was verified that the oscillation condition used here which we call wire waves, in spite of about equally large wave lengths as the transverse wave, assumed to be correct excitation conditions, with relatively slight damping also propagate in very fine wire of which the diameter can be indeed substantially smaller than the wave-length. Here any disturbing interference field is lacking, since the wire vibrates as a whole.

* * *

Oscillations of this kind react very sensitively also on the smallest defect of whatever kind. Even a drop of liquid on the wire occasionally causes a total reflection which then would consequently be registered as a defect. Since here the impulse-echo method can be used, only one sound-head being thus required, it is possible without further concern to work with a liquid coupling and as a result to use high testing velocities. This one sound-head irradiates for the testing in such manner that the wire wave travels in the wire in the direction from which the untested wire comes, and so is still dry. It causes no difficulty to let the wire run in to the testing apparatus quite dry and clean. On the exit side, adhering residue of liquid acts to no disadvantage because in this direction there are no wire waves traveling and, as a consequence, cannot be reflected back to the sound-head.

* * *

In practice the testing is done with a special apparatus which includes the sound-head with ad-

justable angle. The wire slides through a blank holder adjusted exactly above the opening (Fig. 3) where the liquid escapes. Circularly around this opening there is a trough in which the liquid is caught and from which it is returned through a pipe to the water tank. A pump with adjustable speed assures steady circulation of the coupling liquid, which in general consists of water with a wetting agent. According to the kind and purpose of the wire, other liquids, as diesel oil for example, can be used. In Fig. 3 the propagation of the wire waves, with greatly exaggerated amplitude, is indicated by a wavy line.

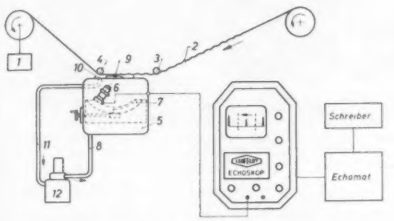

Fig. 3 — Schematic construction of the wire testing apparatus: 1. driving motor for coiling the tested wire; 2. wire in the testing field; 3. & 4. blank holder; 5. water tank containing the sound-head; 6. sound-head; 7. segment for the angle adjustment of the sound-head; 8. water intake; 9. escape opening for the water, also the point of the sound coupling with the wire; 10. water out-flow; 11. liquid return pipe; 12. pump. Schreiber = recorder; Echomat = Echomat; Echoskop = echoscope. * * * * * *

Figure 4 shows the core of the testing apparatus itself, with the indicating numbers the same as for Fig. 3. The liquid tank containing the sound-head is turned over sideways so that its details can be recognized. Fig. 5 shows the complete testing plant, inclusive of the impulse-echo appliance Echoscope and the auxiliary instrument Echomat, which is used for recording or also for automatically plotting the defective places on the wire.

* * *

With wire free of defect, the echo from the contact point between water and wire is seen on the image screen of the Echoscope on the left. Somewhat in front of this echo is the transmission impulse which is suitably turned out toward the left by the adjustment of the instrument, so that then it is no longer visible on the screen. The so-called "lead" of the sound, or the sound travel between

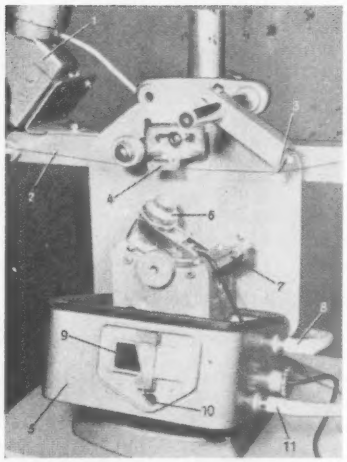

Fig. 4 — The core part of the wire testing apparatus (numbering the same as for Fig. 3). * *

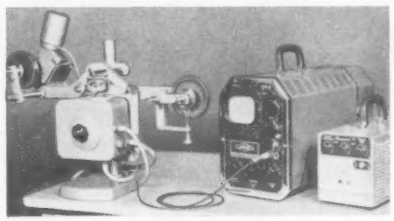

Fig. 5 — The complete testing equipment with Echoscope and Echomat. * * * * * *

quartz and the coupling point, is without interest for the testing, and is moreover constant in timing, so that for the test it suffices if the screen image begins where the ultrasonic pulse enters the wire.

* * *

Through zig-zag reflections on the walls of the water container, which carries the sound-head, impulses are also visible, which cannot be wholly avoided; but these have nothing to do with defects in the wire and do not distort the test. Also pulses of this kind have a fixed travel time; they are therefore steadily in the same place in the screen image and have nearly the same amplitude. In Fig. 3 at the farthest right is drawn the pulse of this kind of origin. For the testing it is of no disadvantageous significance; moreover it is possible without difficulty to install the test instrument Echoscope in the time scale of the pulse spectrum so that the first pulse of this kind originating from the zig-zag reflections from the water container shall disappear beyond the right edge of the screen.

The Echomat, which serves for the automatic control of the defect report, contains an electronic relay which reverses as long as a defect echo appears in the range under inspection. In Fig. 6, S is the transducing impulse, which can be moved toward the left so far that it is no longer visible on the screen. V is the echo of entrance point of the sound wave into the wire, R the first echo of a zig-zag reflection out of the water bath. Wire free from defects shows no reflection in the range B. If a defect occurs in the length under test, then this emits a defect impulse which, traveling from right to left, also appears briefly in the range B. In this time interval the relay reverses in the Echomat and can thereby actuate a signalling instrument. The range B corresponds to a wire length of about 20 cm. (7.9 in.). In Fig. 3 this kind of an interference echo is shown in the middle, marked by an arrow, and the arrow shows that this impulse from the testing is moving in this direction, just as also the direction of movement of the wire itself is indicated by an arrow in Fig. 3.

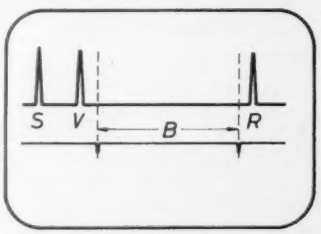

Fig. 6 — The action of the Echomat. The range B (time or length) is automatically monitored for defect pulses. * * * * * * * *

By observation of the screen image in the testing, a defect in the wire will not be overlooked, because not only is a plainly visible pulse associated with it, but because, more than this, such a pulse moves from right to left corresponding to the wire velocity. Only pulses that originate in defects move thus on the screen.

* * *

In order to automatize the test and to make superfluous the watching of the screen image, the Echomat is used. If the relay built into the Echomat reacts to a defect in the wire, a signal is re-

(*Please turn to page* 1178)

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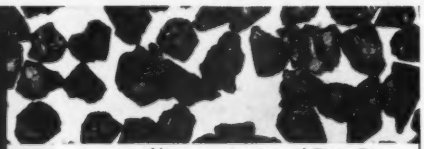

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In this department will be published helpful hints on how to do things and the questions asked by our readers on wire processing problems, together with the answers and comments thereon received from the field. In no instance will the identity of the persons asking for advice or of those supplying it be published.

Our readers are invited to send helpful contributions and to submit questions on their technical problems to the Editor. These will be answered from information on hand or from the field, when it becomes necessary to secure counsel from that source.

High Tensile Wire and Strand For Prestressed Concrete Use

Earlier this year in the "Wire Kinks" Section we published a question and some answers on this subject.

* * *

One of our readers read this and has offered some supplemental information, which is published following his letter.

The Letter

In reviewing the January, 1960, issue of "Wire and Wire Products" I saw a question under "Wire Kinks" which I think we of Preformed can answer.

* * *

The question of tensile testing prestress strand using slip limiting grips was raised. John A. Roebling's Sons Corporation asked us a similar question quite some time ago. We supplied them with an answer and attached is a copy of the information they are sending out on similar inquiries.

* * *

I think the "Preformed" method is quite simple, and it allows for accurate testing all the time.

* * *

I am also including application sequences of (1) the test splice the Roebling people recommend and, (2) our Guy-Grip dead-ends which can be used on various types of strand.

* * *

It is our hope that we have been of some help.

* * *

Testing 7-Wire Prestressed Concrete Strands With Preformed Line Products (PLP) Grips*

Experience has shown that unsatisfactory results are often obtained when 7-wire prestressed concrete strands are tested in laboratories not specifically equipped for testing these strands. Premature failures occur at the testing machine grips because their details are not those required to develop the full properties of the strand.

* * *

The following test procedure has been developed in an attempt to get satisfactory test results with the strand grips found in most testing laboratories.

Step 1 —
Cut test sample of strand 5′-4″ to 5′-8″ long.

Step 2 —
Assemble proper diameter PLP grips on strand sample in position.

Step 3 —
Place assembly of strand and PLP grips in testing machine and set "V" grips of testing machine.

Step 4 —
If elongation is to be measured assemble 24″ extensometer on strand.

Step 5 —
Load strand to 10% of its specified minimum ultimate strength and set extensometer reading at zero. The elongation used in computing percent elongation is that which occurs between this load and failure.

Step 6 —
Load failure noting elongation on extensometer at instant of failure.

* **The PLP grips are manufactured by Preformed Line Products Company, 5349 St. Clair Avenue, Cleveland 3, Ohio.**

Testing machine speeds are not specified but typical speeds are ¼″ per minute until the yield point is reached and then 1″ per minute to failure.

* * *

Data are not yet available on how many times a PLP grip can be reused.

* * *

ASTM Specification A416-57T for Uncoated Seven-Wire Stress-Relieved Strand for Prestressed Concrete requires a minimum elongation of 3½% in a 24 inch length when measured by an extensometer.

* * *

Specifications in force before the publication of A416-57T call for a minimum elongation of 4% in a 24 inch length. This elongation, however, was measured by increase in separation of the testing machine jaws in accordance with the method outlined in section 11 (b) of ASTM:

A112-54T
Comparison of more than one hundred elongation tests by the extensometer method with tests on the same material by the separation of the jaws method show that any strand which has a 3½% elongation by the extensometer method has more than 4½% by the separation of jaws method.

* * *

If test results are not satisfactory, we will be glad to assist in attaining proper testing procedure.

Cleaning and Drawing Rod

QUESTION

If it is possible, could your "Information Service" give us data on

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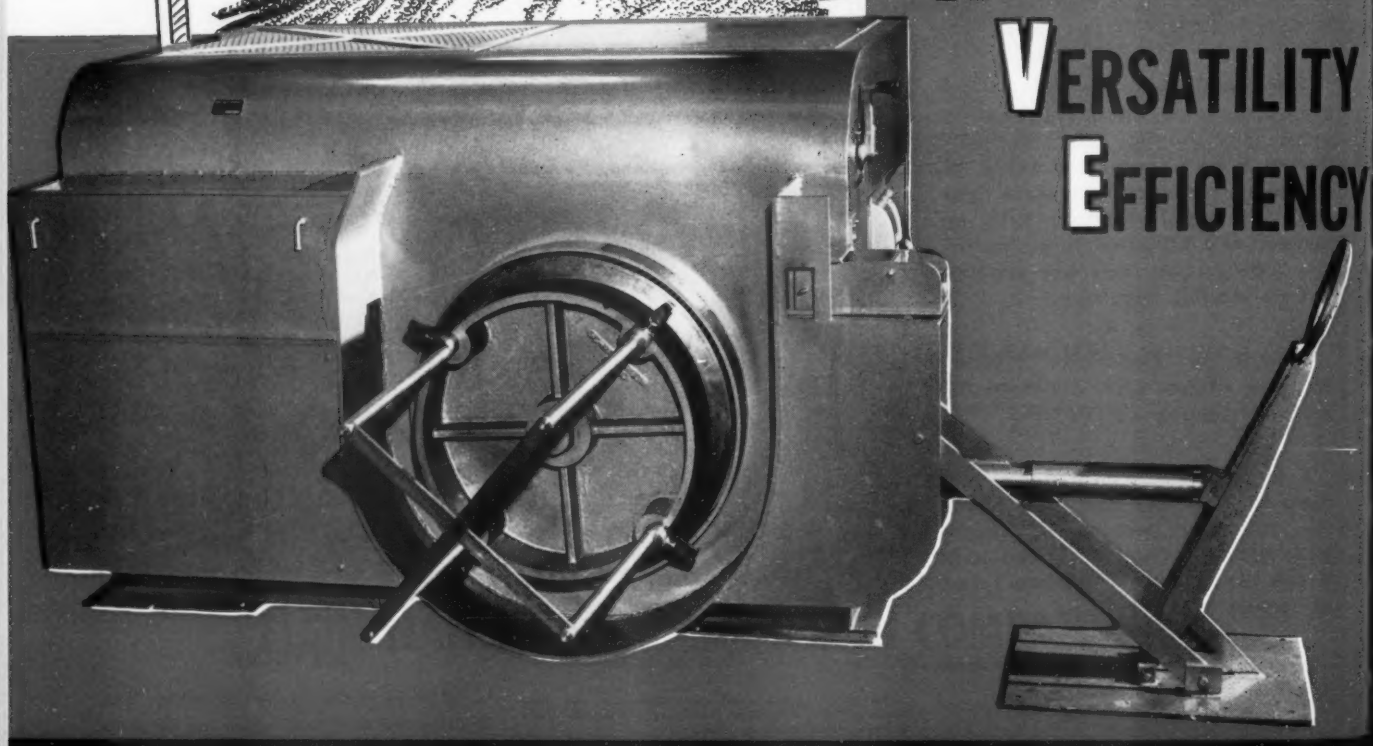
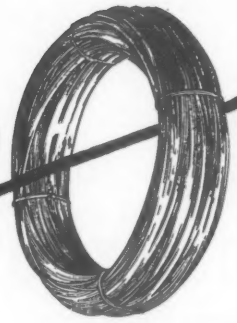


Wire Machinery Inc. 5407 S. KNOX AVE., CHICAGO 32, ILL
Phone: POrtsmouth 7-2508

Wire Kinks



Stainless Steel and High and Low Carbon Steel Wire drawing as to:

1. **Method of cleaning rod with sodium hydride.**
2. **Types of lubricant carrier coatings as to concentrations, temperatures, etc.**
3. **Types of drawing lubricants and where they are used.**
4. **Drawing speeds.**

ANSWER

1. Sodium hydride or caustic soda can be used to descale any ferrous rod, but in practice is used principally on stainless steels and high-speed steels alloyed with tungsten, molybdenum and cobalt. Carbon steels are generally descaled with sulfuric acid.

* * *

Types of furnaces for caustic soda cleaning may have 1) immersed electrodes, 2) immersed electric resistance heaters of the "Calrod" type, 3) immersed gas or oil burners, or 4) gas or oil firing (external).

* * *

The process is based on the ability of the Na OH to reduce metallic oxides to a metallic state or to a lower order of oxides. The reduced material is softened and readily removed by quenching the hot work in cold water. The hot operating temperature is 20 plus or minus 700°F. Metallic sodium bricks are introduced into the furnace. They melt at 207°F. Hydrogen fed into the bottom of the furnace forms the sodium hydride as it percolates up through the sodium.

* * *

2. Drawing lubricants are of two broad types — dry and wet. The former is usually mixed with lime and placed in a box ahead of the first die, the rod or wire picking it up as it passes through the box. Wet lubricants are usually circulated from a central tank and flowed over the dies. In general, it may be said that most coarse and intermediate sizes are drawn dry and all fine wires drawn wet. Copper may be drawn wet in all sizes.

* * *

3. A good book on the subject is "Metalworking Lubricants" by E. L. H. Bastian, published by McGraw Hill Book Co., 330 W. 42nd St., New York 38, N. Y. It costs $6.00.

* * *

4. Drawing speeds depend on the material. Low carbon steels may finish in fine sizes at 3000 FPM. High carbon rope wire has a top speed of about 2000 FPM. Copper and aluminum wire are regularly finished at speeds of 5 and 6 thousand FPM. Stainless steels seldom exceed 600 FPM.

* * *

Drafting reductions also depend on the metal. For steels and common non-ferrous wires an average of 25% is usual, although for certain objectives 30 to 35% may be drawn in the first hole. Products like music wire are never drawn above 10% per hole and usually at relatively low speeds. We have seen aluminum rod given a single hole reduction of 50%, but subsequent drawing will be around 25%.

Patenting by Electrical Resistance

QUESTION

We would like to find out something about patenting wire and, in particular, about electrical resistance patenting.

ANSWER

Patenting is a process by which the ultimate physical strength and fatigue properties of wire may be varied over a wide range. Although speed of drawing, distribution of drafts, and reduction per draft influence the properties of wire, the patenting operation makes it possible to obtain the best possible combination of strength and ductility in cold drawn, high carbon rope or spring wire.

* * *

Simply stated, steel wire depends in large measure upon carbon for strength and hardness. Carbon in its proper form and relationship to other constituents is necessary, but presents a problem in rod as the carbide (Fe_3c), the form usually found in rod before drawing, must be dispersed or oriented in such manner as to render the steel ductile and capable of being severely deformed in the drawing process.

* * *

Patenting consists of heating the rod to a temperature high enough over a sufficiently long interval of time to insure complete solution and diffusion of the carbide. The operation is continuous and is followed by cooling or quenching in air, molten salt or lead. The rate of cooling is important to avoid a lamellar pearlite in the patented structure.

* * *

Size of the grain in the patented structure is largely dependent upon the wire temperature and is almost independent of the quench bath temperature. Slow heating tends to produce a coarse austenitic grain size.

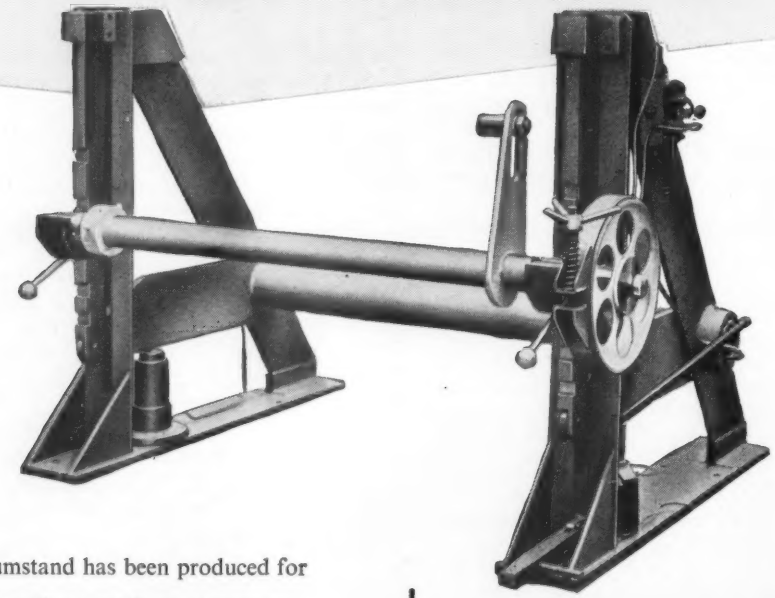
* * *

In resistance heating the current passes through the wire,

(*Please turn to page* 1192)

THE *NEW*

HYDRAULIC PAY-OUT DRUMSTAND



The new LB Hydraulic Pay-Out Drumstand has been produced for quick adaptation for use with any stranding machines to carry an additional stranded core or lead-in wire. It is ideal for extruding lines. All loading operations have been simplified. The support bearings carrying the through shaft are easily positioned ready for lifting the drum clear of the floor. Hydraulic jacks do the lifting and lowering. The tensioning device is independent of the through shaft to avoid constant dismantling. The Drumstand is made in five standard sizes to meet a variety of drum diameters up to 10 feet and weights to 10 tons. To increase the diversity of application each stand is supplied with two shafts of differing diameters.

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LB 8

Hydraulic Cut-Off and Upset Testing Machine Increases Efficiency in Quality Control

by H. M. Webster
Vice President
H. K. Porter, Inc.
Somerville, Massachusetts

A case history account of a wire mill's experience with this equipment.

A large Eastern steel mill* through the use of two hydraulic cut-off and upset testing machines is saving many thousands of dollars each month.

* * *

Tonnage output has been increased materially by their being able to test steel rod as it is being put up into the coils before shipment. The cuts and tests can be made within a few seconds after the steel comes off the rolling mills, as the testing units are placed right at the work station.

* * *

Formerly the material had been rolled, put up into coils, placed in freight cars or trucks and shipped out. In many instances the testing of the individual runs were not completed until after the material had been received by customers in various sections of the country.

* * *

In the event of a customer's discovery of defective rod, this usually necessitated the recalling of whole car or truck loads of steel and unloading it in order to pull out the defective coils. Besides the loss of time and money in transit, much time and expense was involved in unloading, handling and sorting in order to locate and replace the defective stock with good rod.

* * *

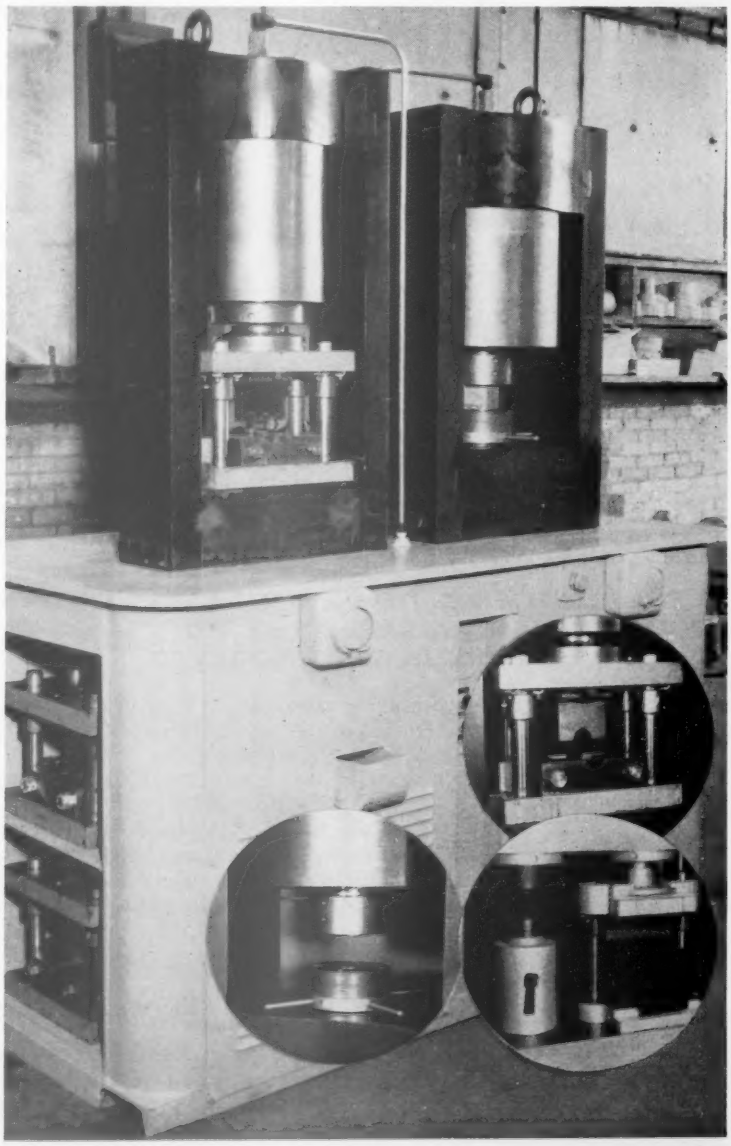
With these units the mill now has a means of making immediate inspection so that they can accept or reject any material before it is even put onto skids or fork trucks for movement to the storage room or the shipping bay.

* * *

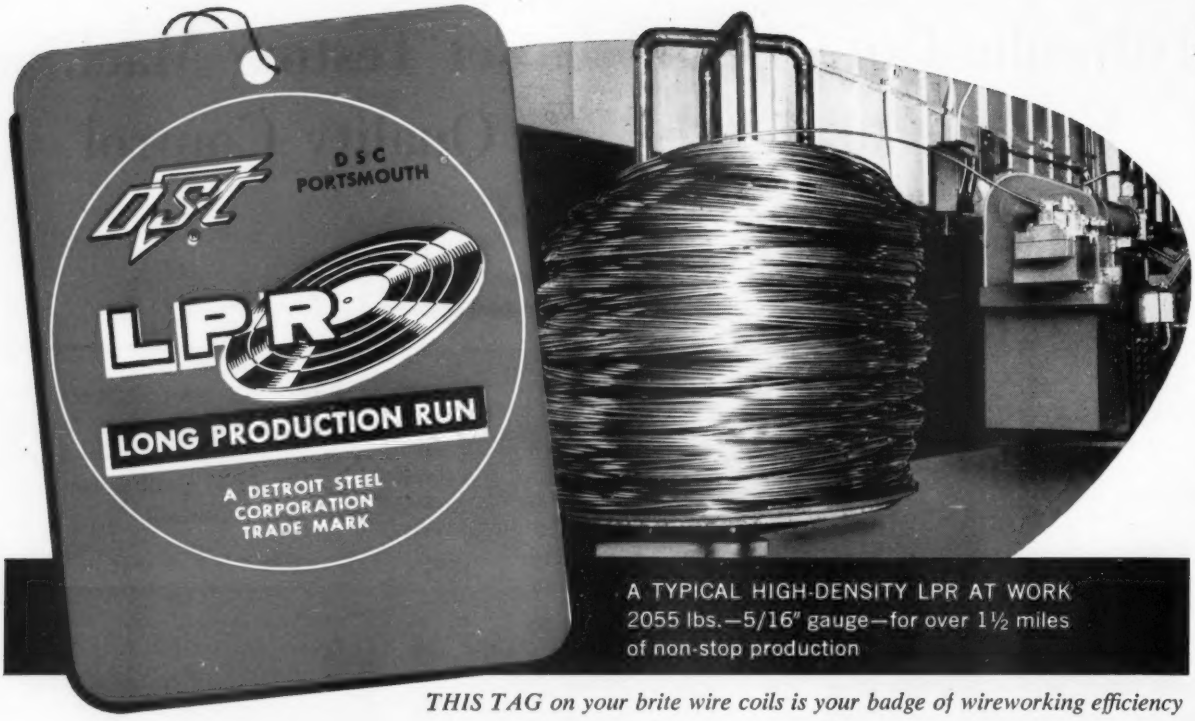
In mills where testing was done, previously huge mechanical presses were used for this purpose. These were located in other sections of the plant and required taking test samples to the press after they were cut by hand from the coils.

Where six men formerly were used on this operation, they are now using only two men to make the tests for quality control on their new machines.

(*Please turn to page* 1183)



* Name furnished upon request.



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Some Problems on Studies of Thermal Evaluation of Magnet Wire

by

Dr. K. Mase
Chief Engineer

and

M. Koga, Engr.,
Magnet Wire Section

Hitachi Wire & Cable Ltd.
Hitachi City, Japan

As attention recently has become centered on problems of life tests and thermal classifications, this article deals with a study of some problems that must be taken into consideration when conducting life tests on enameled wire.

D. K. Mase

Introduction

Thermal classification has recently become the subject of active discussion. In this connection, various life test methods are being studied and the results of many experiments (1) have been reported, mostly concerning enamelled wire.

* * *

The main objective of these reports at first was to study the heat stability of individual materials. But the results of many experiments showed that the best stability of independent insulating materials does not always indicate the heat stability of an insulating system in which they are combined. Therefore, these reports state that there is compatibility among insulating materials.

* * *

This means that a combination of independent superior insulation materials will not always form an excellent insulating system, whereas the heat stability of electrical machines and apparatus can be further improved by considering the most suitable combination of insulating materials. This aspect presents an important problem to be considered in designing and manufacturing electrical machines and apparatus.

* * *

As the writers and others considered that an ideal combination of insulating materials is one which serves to lengthen the service life, the term "life resonance" will be used here.

* * *

"Life resonance" is probably most important between the magnet wire and insulating material. In order to study the "life resonance" between the two, it is necessary to establish a method of evaluating the life of the insulating system. Although various methods have been conceived, this problem is complicated because the service life will differ according to the type of electrical equipment and how it is used. Therefore, although there are test methods which can be used tentatively as standards, the service life cannot be determined arbitrarily by these methods. The only means in the present situation is to use such methods as a basis for study.

* * *

Points arising as problems in conducting life tests and some problems concerning combination of insulating materials, especially from the standpoint of "life resonance," will be dealt with in this thesis.

M. Koga

Some Problems Concerning Life Test

(1) Construction of Magnet Wire

The construction of magnet wire varies according to the purpose of application. For example, those of rather thick insulating covering are generally used for power machines and apparatus while those of thin insulating covering are usually used for communication equipment. Those for use at very high temperatures, such as inorganic insulating wire, have nickel plated or nickel clad conductors.

* * *

However, consideration of the construction of samples is often neglected in discussion of the heat stability of magnet wires.

(a) Effect of Film Thickness on Samples

Fig. 1 gives the results of examination of the heat stability of polyvinyl-formal wires having the

to serve the wire industry

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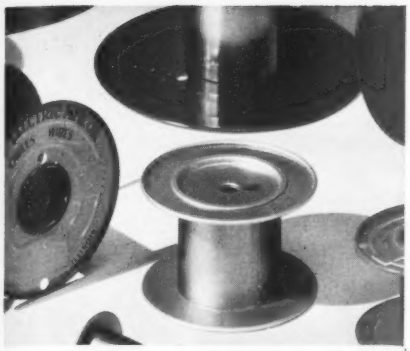

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same 1.0 mm conductor diameter but different film thickness. The heat stability was examined by the twist pair method of AIEE No. 57 (2), decrease in film-thickness method and change of torsion number method (3) (polyvinyl-formal wire is twisted with 200 mm gauge length and the number of torsions required to peal off the film and expose the conductor is measured).

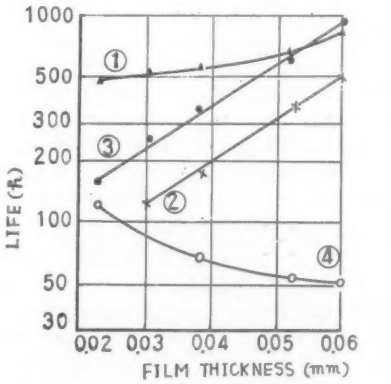

FIG 1 EFFECTS OF FILM THICKNESS FOR HEAT STABILITY

The relation between the film thickness and life can be expressed by the following equation (1) for the twist pair method without varnish impregnation treatment in Fig. 1.

$$\log t = 21.3\,D + 1.441 \quad \ldots\ldots (1)$$

provided,
t : life (h)
D : film thickness (mm)

* * *

AIEE No. 57 specifies a fixed check voltage value for samples whose film thickness is within a certain range, but there is need to change the check voltage more finely according to the film thickness even in cases of same conductor size. Another point to be remembered is that the heat stability obtained by the torsion number method becomes poorer as the film thickness increases, which is opposite the results obtained by the other method. In some types of electrical equipment the wires are subjected to severe vibration and other mechanical conditions, which goes to prove that a test method covering all these conditions must be originated.

(b) Effect of Conductor Surface Condition

The effect of conductor surface condition on the film life has been reported in considerable detail by J. H. Thomas (4) and others. Fig. 2 shows the results of the writers' studies on the dielectric strength reduction at 175° C by the twist pair method for polyvinyl-formal wires having a 0.0255 mm film thickness and 0.6 mm conductor diameter.

* * *

As copper will become a catalizer of oxidized deterioration at high temperature, it is assumed that deterioration will be rapid in case of ordinary copper conductor. As seen clearly in Fig. 2, the accelerated aging test indicates that copper conductor wires deteriorate more rapidly than wires with nickel plated conductors even at a comparatively low temperature of 175° C.

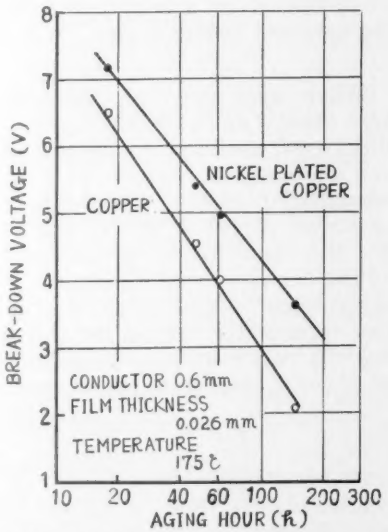

FIG 2 EFFECTS OF CONDUCTOR FOR DETERIORATION

(2) Life Test Method and Life Expectancy

As studies on life test methods are advanced, determination of the proper testing time arises as a difficult problem, i.e. how many hours of expected life should be required at the temperatures of Class A and Class B insulation. The "test procedure for thermal stability of enamelled wires" recommended by AIEE (2) (5) and IEC (6) does not deal with this

problem. The procedure is only based on comparison of insulating materials whose behavior is known through actual experience. However, since the present classification as Class A and Class B is based on the old organic-inorganic concept, its adequacy is doubtful.

* * *

As the service life of insulating materials will differ according to the conditions of usage, the meaning of life expectancy will naturally differ in some points according to application such as between a rotating machine and a static machine.

* * *

In this connection, there have been interesting reports by Hans-Jurgen Frentz (7) and L. C. Whiteman (8) concerning logical estimation of life expectancy of practical machines. In brief, they dealt with the problem of deterioration under fluctuating temperature by utilizing the deterioration — temperature relation obtained for constant temperature.

* * *

When analyzing the temperature change under the service conditions of electrical equipment, it can generally be considered as a comibnation of the straight lines or curves of (a) ~ (e) in Fig. 3. If the equivalent temperature (fixed value) can be computed for these fluctuating temperatures, the service life can be estimated for the combination or repetition of these changing temperatures.

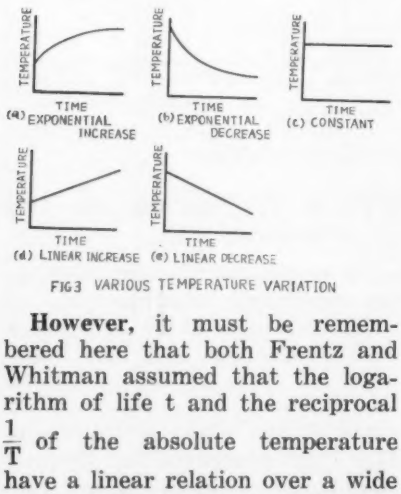

FIG 3 VARIOUS TEMPERATURE VARIATION

However, it must be remembered here that both Frentz and Whitman assumed that the logarithm of life t and the reciprocal $\frac{1}{T}$ of the absolute temperature have a linear relation over a wide range of T. It has been pointed out through experience that, among many insulating materials, there are some which do not display the above linear relation. (9) But such expectations do not lower the value of their researchers.

* * *

If the temperature change of a certain electrical equipment under service condition can be measured definitely by the above method, it would be possible to calculate the thermal life of a certain type of magnet wire used in that equipment. The problem of how many hours should be taken as the life expectancy, will be solved by itself when the thermal classification of the equipment is known. If the calculated result differs from that observed through experience, the temperature — life relation used as the basis of calculation was probably not obtained from a test method suited for the construction conditions of that particular equipment.

* * *

From the above reasoning, we find that the life expectancy (hrs.) of insulating materials cannot be determined indiscriminately but must be dealt with separately for each machine or apparatus.

(3) Short Cutting of Life Test

A long time is generally required for a life test. Therefore, an accelerated deterioration test is usually conducted at a temperature which is much higher than the practical temperature.

* * *

The writers tested various enamelled wires by the twist pair method according to AIEE No. 57 (1955). It was found that there is no need to continue the life test until breakdown of all specimens if 40 ~ 50 test specimens are used.

* * *

For example, Fig. 4 shows the test results on 1.0 mm polyvinyl-formal wires as a histogram for each cycle. It can be regarded as an almost normal distribution. With this data as the basis, Table 1 gives a comparison of the average life computed for the cycle which was cut short after failure of half of the specimens and the average life computed for the cycle in which all specimens ended in breakdown. The average life was almost the same for both cases, with a difference which can be disregarded in this kind of a test.

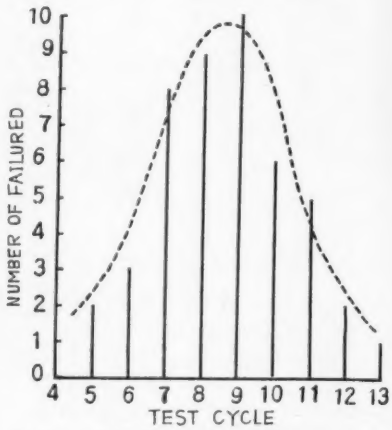

FIG 4 FAILURE HISTOGRA OF POLYVINYL- FORMAL
CONDUCTOR 1.0 mm
FILM THICKNESS 0.04 mm
CHECK VOLTAGE 1 kV
AGING TEMPERATURE 160 ℃
1 CYCLE 150 HOURS

TABLE I - COMPARISON OF CALCULATED LIFE

TOTAL SPECIMENS	SPECIMENS FAILING	CALCULATED LIFE (h) UPPER LIMIT	AVERAGE	LOWER LIMIT	VARIANCE (h)
48	24	1322.2	1200.6	1112.5	312.0
48	48	1282.7	1193.8	1104.9	306.2

If an extremely high temperature is used in the test, all specimens may break down even at the first cycle. But such a case is not considered here.

* * *

If the test can be cut short, it can be performed in a short time by testing with the same temperature or it can be performed at a lower temperature near the practical temperature by testing with same periods. Thus, this method enables shortening of testing period and improvement of reliability.

Effect of Varnish Impregnation On Life of Enamelled Wire

Excepting a few special cases, magnet wires are used with coil varnish. In regard to compatibility of enamelled wire and coil varnish it has been pointed out (10) that the service life of enamelled wires will be lengthened or shortened according to the kind of varnish used.

* * *

The purpose of varnish treat-

ment is to fix the coil to prevent vibration and also to shield it from external factors, such as moisture, dust and chemicals, and thereby raise the thermal conductivity and lengthen the service life of the enamelled wire. In other words, its purpose is to lengthen the service life of the electric machine or apparatus. This varnish treatment would be meaningless if it shortens the service life. The effect of varnish treatment on the service life of enamelled wire will be examined in detail here.

(1) Detrimental Effect of Residual Solvent

Although solventless type varnishes, such as epoxy and polyester, are being used recently to some extent, solvent type varnishes are still in wide use. It is generally assumed that the solvent contained in solvent type varnish is completely removed during drying of the coil. However, according to study by the writers, a volatile component of about 20% of the adhering varnish is still contained even in case of coils dried (assumed to be dried) immediately after production, although this may differ according to the design of the equipment. The volatile component contains not only solvent but also moisture. It can be surmised that this residual solvent will have serious effect on the enamel film at the initial stage of heating when conducting an aging test at high temperature, because the solvent's attack on the enamel film will be accelerated as the temperature is raised. Therefore, solventless varnish treatment is better for the heat resistant life of enamelled wire.

* * *

Fig. 5 shows a comparison (11) of the results of motorette tests on 0.6 mm polyester enamelled wire treated with solventless varnish and the same wire treated with solvent varnish. When the Mandrel test method is used to compare the heat resistances of specimens on which these different types of varnish are baked on, varnish B has a much better heat resistance. But the motorette test results indicate that varnish A is better. The difference between straight lines B 1 and B 2 indicates

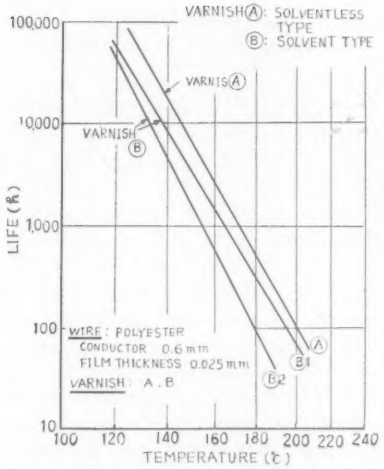

FIG 5 EFFECTS OF IMPREGNATING VARNISH

the difference of drying and baking condition. B 2 can be considered as having more residual solvent than B 1. The drying conditions were as follows:

B 1 : heated 1.5 hours at 130° C
B 2 : heated 10 hours at 105° C and 2 hours at 130° C

* * *

The difference of straight lines A, B 1 and B 2 cannot be attributed entirely to the effect of residual solvent but its effect can be surmised as being a major factor.

* * *

One of the reasons why the motorette test results do not always match the twisted pair specimen test results, can be attributed to the fact that the twisted pair specimens are of simple shape whereas the motorette has a complex shape having a greater probability of residual solvent.

(2) Compatibility of Varnish and Enamel Film

The meaning of the term "compatibility," as used here, concerns only the interaction between the coil varnish and enamel film, i.e. the effect due to the difference of physical and chemical properties of the varnish film and enamel film. It is assumed that this is the main reason why varnish treated specimens sometimes have shorter life than untreated specimens in case of rather simple specimens such as used in the twisted pair test method of AIEE No. 57.

* * *

Fig. 6 shows the results of the writers' test by the twisted pair method on polyvinyl-formal wire and polyurethane enamelled wire treated with alkyd type varnish and those which were not given varnish treatment. The life of the polyvinyl-formal wire has been extended by the varnish treatment. But, in case of the polyurethane enamelled wires, those without varnish treatment have a much higher heat resistance. In the writers' experiments, the life of polyvinyl-formal wires was extended in almost every case by varnish treatment regardless of the kind of varnish used. However, in case of polyester enamelled wire and polyurethane enamelled wires, it was found that there are quite a few coil varnishes which shorten the life.

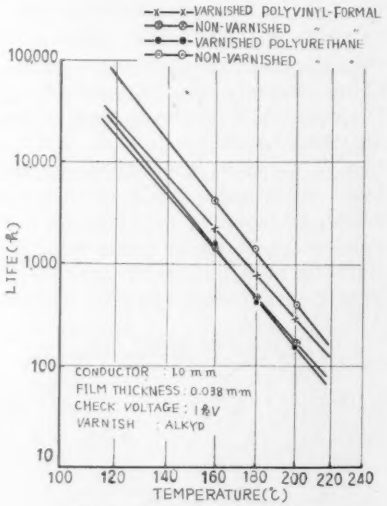

FIG 6 EFFECTS OF VARNISH IMPREGNATION

Such shortening of life by varnish treatment is believed to be due mainly to poor heat resistance of the varnish coating, whereby cracking of the varnish coating caused by heat deterioration spreads to the enamel film and lowers the dielectric strength of the twisted pair specimen. On the other hand, there could be cases where the varnish coating prevents cracking of the enamel film. The long heat-resistance life (12) of the twisted pair specimen consisting of modified silicone enamelled wire treated with silicone varnish can be given as one example of such protective influence.

(3) Appropriate Varnish Impregnation

As reported previously, (13)

there are cases where the solvent contained in coil varnish damages the enamel film during the drying process after varnish impregnation. Also, when reduction of the practical film thickness occurs due to shortening of the distance between conductors by film softening, the life of the machine or apparatus will be shortened. However, the method of varnish impregnation will be studied here.

* * *

Coil varnish impregnation for large electrical machines is generally performed in vacuum in order to prevent occurrence of voids and also to assure complete impregnation into the interior of the coil. However, in case of small machines, the coils are usually treated by simply soaking with varnish. Although the permeation into the interior of the coil of machine depends on the viscosity of the varnish, it can be surmised that vacuum impregnation is better. Fig. 7 gives a comparison of the heat resistance of a motorette which was simply soaked with solventless varnish and the heat resistance of a motorette given vacuum impregnation. In this Figure,

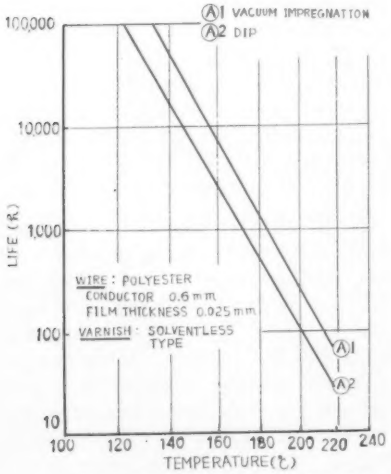

FIG 7 EFFECTS OF IMPREGNATION

the vacuum impregnated specimen (A 1) has a definitely higher heat resistance. Since vibration is applied in addition to heat exposure and moisture exposure in the motorette test, the wire will not shift easily and the life will be extended if the varnish has permeated sufficiently into the coil and hardened.

Effect of Ground And Phase Insulation

It has become common sense to use magnet wires, varnish and insulating materials of same heat resistance when designing electrical equipment. And it is considered that the only way to improve heat resistance is to use magnet wire having higher heat resistance. However, it was found that the composition of the insulating system requires careful attention even when only the effect of varnish treatment is considered. Another problem that must be considered besides varnish treatment, is the effect of ground and phase insulation as pointed out by Saums (10) and others. Of course, in regard to selection of materials, there are cases where the most suitable composition cannot be applied practically owing to the cost. Fig. 8 gives a comparison of mo-

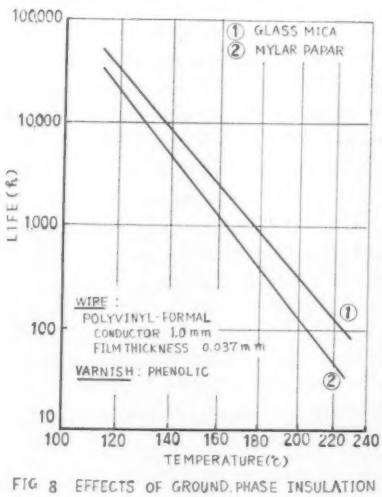

FIG 8 EFFECTS OF GROUND PHASE INSULATION

torette test results where only the ground insulation and phase insulation were varied while using the same wires (polyvinyl-formal wires) and same varnish (phenol type). The difference of ground and phase insulations appears distinctly, especially at high temperature. This is believed to be due to increased effect of vibration, etc. caused by gaps forming in the motorette when the heat resistance of the ground insulation or phase insulation is lower. However, such a distinct difference will not occur when certain varnishes are used.

Conclusion

This thesis has dealt mainly with recent problems concerning construction of wires and life tests and effects of varnish treatment and insulation materials. A summary of the results of this study is as follows:

1. **The heat resistance varies greatly according to the conductor surface condition and wire construction.**
2. **The service life varies greatly according to the varnish treatment method and type of varnish used.**
3. **The other insulating materials besides the varnish will also affect the life of the wire or motorette.**
4. **It seems that the life test can be conducted in much shorter period by short cutting in case of the twisted pair method.**
5. **The life expectancy should be discussed in relation with practical machines and apparatus. In the near future, it will probably become possible to calculate the life expectancy of practical equipment.**

* * *

When designing and producing practical equipment, the above points should be kept in mind to select the best materials (with cost considered) and method of usage in order to advance constantly towards "life resonance."

* * *

The twisted pair method life test of AIEE No. 57, etc. should be considered as a preparatory test for conducting more functional tests. And it is hoped that final specifications will be determined by tests which are appropriate for each electrical machine or apparatus.

* * *

The writers wish to take this opportunity to express their thanks to Mr. C. A. Litzer for his aid in presenting this thesis.

Reference Literature

(1) **AIEE. Committee Report: Electrical Manufacturing, p. 91 May (1959)**
(2) **AIEE. Standard No. 57 (Oct. 1955)**
(3) **K. Mase: Journal of the Institute of Electrical Engineers of Japan, Vol. 74, p. 797 (1954)**
(4) **J. H. Thomas, J. F. Dexter: Power Apparatus and Systems, p. 1009 Dec (1957)**
(5) **AIEE. Standard No. 57 (Jan. 1959)**
(6) **IEC. TC-15 (Central Office) 19 (May 1959)**
(7) **Hans-Jurgen Frentz: E.T.Z-A. Bd 78, H 4, 11, p. 156 (1957)**

(*Please turn to page* 1192)

Government Organization Manual

The General Services Administration has announced the publication of the 1960-61 edition of the "United States Government Organization Manual."

* * *

As the official organization handbook of the Federal Government, the manual is divided into legislative, judicial and executive sections. The handbook outlines the legislative authority, purpose and functions of each agency, and 42 charts delineate the organization of Congress and the executive departments and agencies. Listed are the names of more than 4200 officials.

* * *

Compiled by the Office of the Federal Register of the National Archives and Records Service, General Services Administration, the 817-page manual may be purchased for $1.50 a copy from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

Low Inter-Conductor Capacitance Cable

Spectra-Strip Wire & Cable Corporation announces the extension of its flat bonding technique into the field of low capacitance cables and harnesses. This new product is Verilocap®. The conductors in this cable are spaced apart by means of high quality vinyl tubing, and the result is a very attractive looking cable, with extremely low interconductor capacitance.

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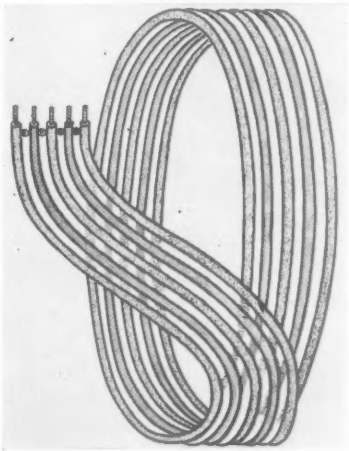
A brochure on this, and the other flat ribbon cables, is available from **John Ford,** Sales Manager, Spectra-Strip Wire & Cable Corp., Box 415, Garden Grove, Calif.



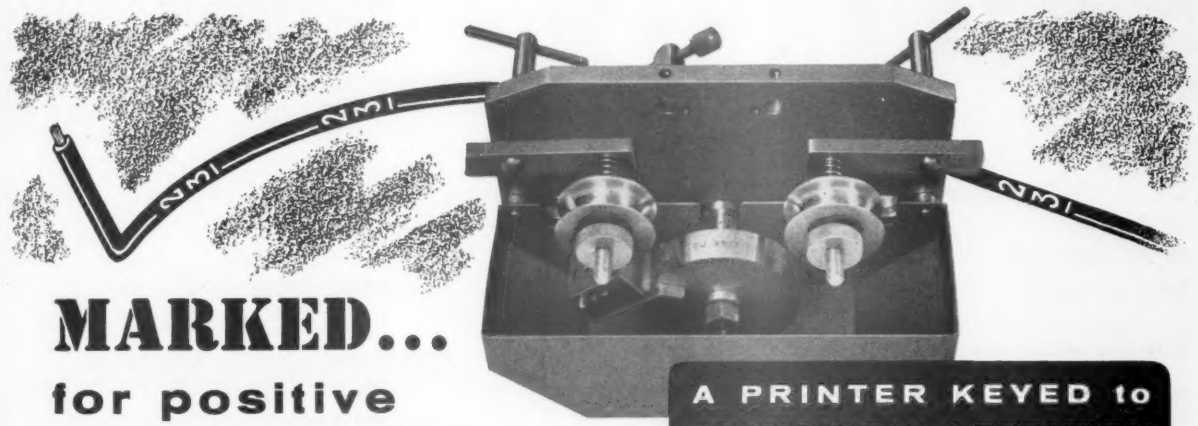
Verilocap Low Capitance Cable

Stainless Tubing Solves Corrosion Problem

Stainless steel is helping to combat the mud and another contaminant — acid — with tubes used in steam condensers by power companies along the Monongahela River.

* * *

Power companies, using a nonferrous metal, were forced to replace tubing in their steam condensers every five to eight years. Two years ago one of the power companies retubed one of its condensers with corrosion resistant Type 304 stainless steel tubing



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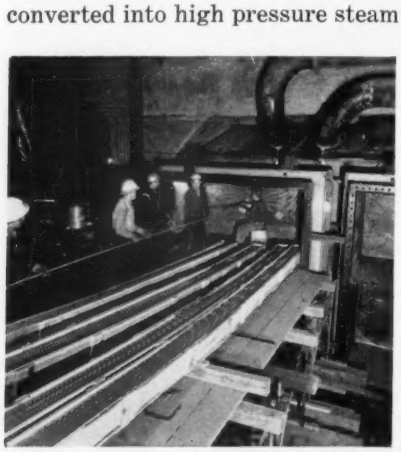
supplied by **Allegheny Ludlum Steel Corporation.** This was the beginning of what very likely will be common practice.

* * *

Duquesne Light Company will complete a new unit at its Elrama power producing station in September. Now under construction, the steam condenser will contain 15,412 Type 304 stainless steel tubes. Each is 30 feet long with a 7/8 inch outside diameter. The overall condensing surface area is 105,000 square feet. These tubes have a life expectancy of 30 years.

* * *

The condenser condenses exhaust steam from the low-pressure turbine to water. The water is returned to the boiler where it is converted into high pressure steam



Thirty-foot long stainless steel tubes are shown being inserted in a steam condenser at Duquesne Light Company's Elrama Power Plant. * * *

to run the 165,000 kilowatt turbine generator. Approximately 90,000 gallons-per-minute of river water are pumped through the condenser to condense it to water. The equipment is capable of condensing 850,000 pounds of steam per hour.

* * *

The pH value of Monongahela River water at Elrama drops as low as 3.5. The pH value is a number between 0 and 14 denoting the degree of acidity or alkalinity. A solution having a pH value of 7.0 is neutral. Numbers below 7.0 denote acidity and those above denote alkalinity. A pH value of 3.0, for example, indicates a highly acidic condition.

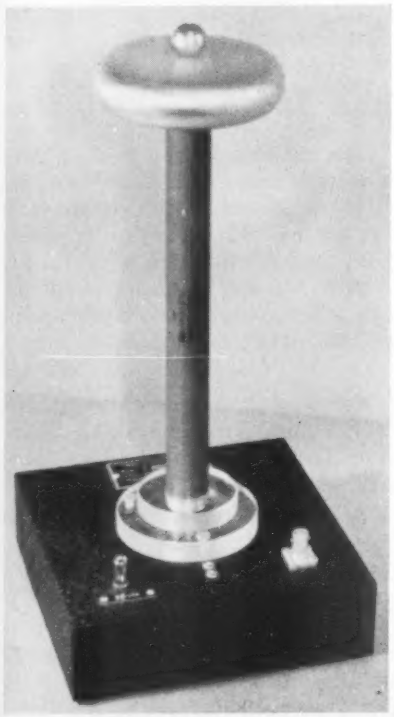
* * *

Such water has been corrosive to previously used condenser tubes,

creating many problems. Among them is the film produced by corrosion that tends to retard heat transfer from the steam to the cooling water. If this corrosion film is not removed when the tubes are cleaned, condensing ability is reduced. On the other hand, if the film is removed at each cleaning, the bare tube metal again is exposed to rapid attack from the acid river water.

Corona Pick-Up Network

Although complete Corona Test Sets are normally sold by **Peschel Electronics, Inc.,** there is a frequent need for component parts of this system. The Corona Pick-Up Network pictured here is available to those who have adequate scope facilities and a corona-free testing transformer, but lack this important item. Composed of a corona-free high-voltage capacitor and a suitable RF choke with input and output connections, the corona pick-up network is an L-C voltage divider designed to resonate at approximately the correct frequency and to match the usual pulse amplifier/scope detector combination used in Corona Test Sets. ■



Corona Pick-Up Network

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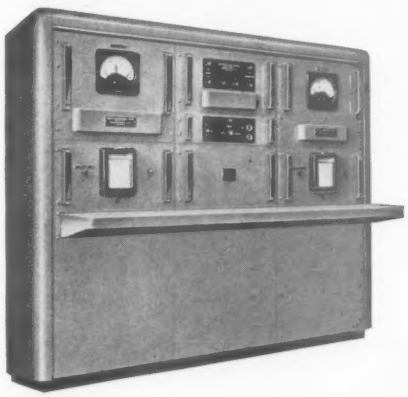
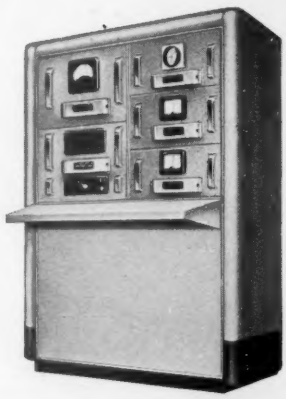


Typical small Extrusion Control Station, combining Automatic Capacitance with Size Control and Recording



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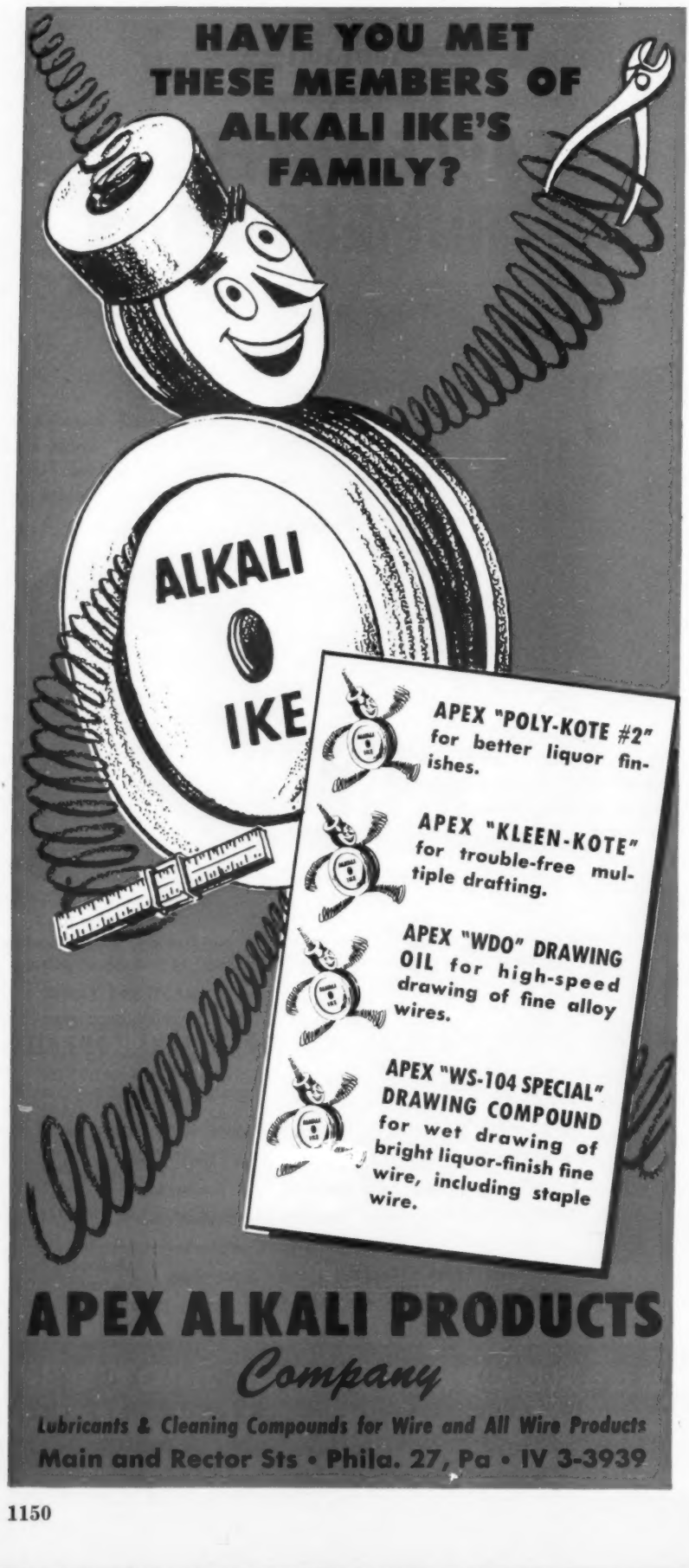
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* * *

For complete Corona Test Sets or scope detector units consult general catalog of High Voltage Test Sets manufactured by Peschel Electronics, Inc., Towners, Patterson, N. Y.

Multi-Conductor Cable and Hook-Up Wire Catalog

A completely new 18-page "Multi-Conductor Cable and Hook-up Wire" catalog — covering Teflon TFE, Teflon FEP 100, and PVC — describes Times' wire design and engineering capabilities including round and ribbon cables and assemblies.

* * *

The catalog is the first in the industry to describe full lines of U/L Approved Teflon wire, and Teflon FEP 100 hook-up wires. Easy reference sections provide a wealth of useful background information on various conductors and insulating materials.

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For a copy of the catalog contact **Times Wire and Cable Division,** The International Silver Company, Wallingford, Conn.

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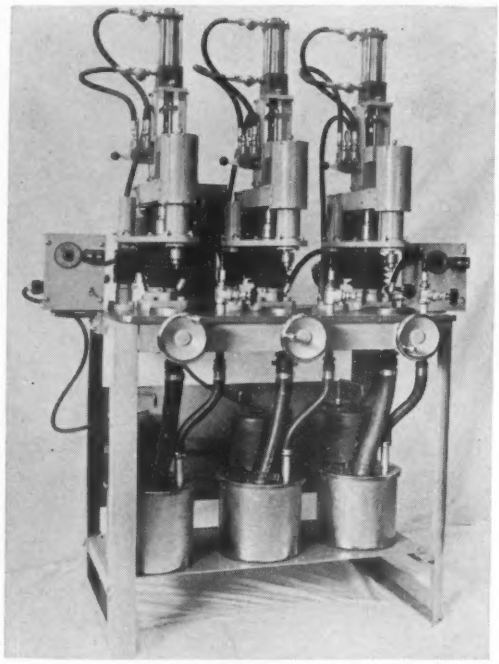

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* * *

New relaxation data, never before published, are now available on such materials as Inconel "X" alloy. This alloy has useful spring properties at service temperatures up to 1200°F. You can find such information on Inconel "X" and other alloys in the enlarged, revised T-35 Technical Bulletin published by the Huntington Alloy Products Division, **International Nickel Co.**, 67 Wall St., New York 5, N. Y.

* * *

The bulletin also has useful inmation on the manufacture of springs as well as on the properties, production and thermal treatments of nickel alloy spring wires.

New National Electric Office In Philadelphia

It has been announced that the **National Electric Division** of **H. K. Porter Company, Inc.**, has leased a suite of offices at 1528 Walnut Street, Philadelphia, to serve as headquarters for its sales staff, covering Eastern Pennsylvania, Southern New Jersey and Delaware.

* * *

National Electric is among the country's largest producers of electrical "roughing-in" materials. It manufactures rigid steel conduit, under floor duct, wires and cables, busways and metal surface raceways.

Nesor Alloy Occupies New Plant

In a move aimed at sharply expanding current production quotas, **The Nesor Alloy Products Company** has opened a new plant and

adjoining sales and administrative facilities at 666 Passaic Avenue, West Caldwell, N. J., which now is in full production.

* * *

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Welding Skills and Practices

This new book, published by the **American Technical Society,** 848 E. 58th St., Chicago 37, Ill., is authored by **J. W. Giachino, William Weeks** and **Elmer Bune.**

* * *

Welding Skills and Practices provides practical instruction in the development of specific welding skills and presents a general over-view of the various welding processes. It is divided into two parts — oxyacetylene welding and electric arc welding including inert-gas-shielded arc welding. Each section covers current welding operations, with numerous illustrations added to provide valuable help in understanding the text material.

* * *

This book meets the demand for a text which gives full and complete coverage to all types of welding. It is organized so that students can be divided into several groups, making is possible for them to pursue the most logical

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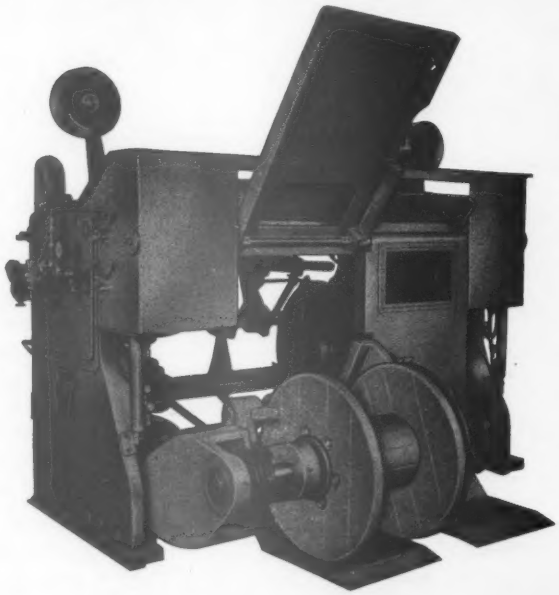

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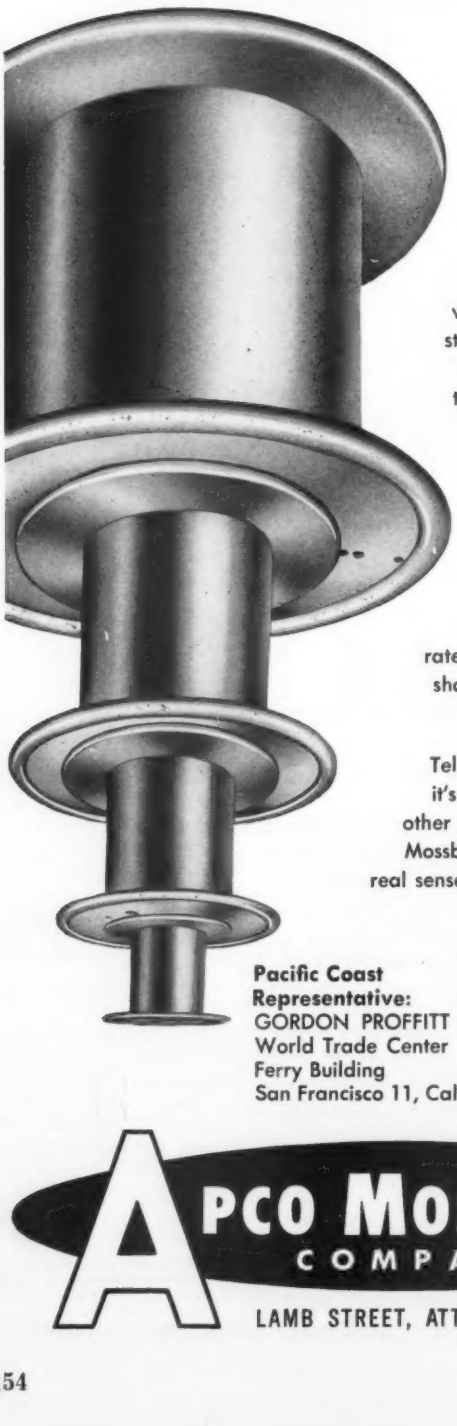

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sequence of instructional experiences.

* * *

Beginners and veterans alike will profit from the up-to-date technical information and the explanations of manipulative skills, thereby increasing the chance for success in a field which is rapidly expanding to include the fabrication of many new materials and products.

* * *

The book contains 279 pages of tables, illustrations and text and sells for $4.95. It may be ordered from the Society.

New WRI Building Design Handbook

Publication of the new WRI Building Design Handbook has been announced by the wire reinforcement industry through its national trade association, the **Wire Reinforcement Institute,** Washington, D. C. The book is intended for use by designers, engineers, architects, consultants and others concerned with reinforced concrete construction.

* * *

The 168 page handbook is divided into two parts. The first part consists essentially of general text and pictures describing the ways in which steel wire fabric is put to effective use. Tables, sketches and detail drawings are included to help the design engineer and his draftsmen. Also in part one are several case histories of projects in which wire fabric has been used to particular, or unusual advantage.

* * *

The second part of the design handbook deals primarily with the rapidly widening use of heavy welded wire fabric, and, being principally a series of actual design tables (with necessary explanatory text) is expected to be a working tool in the actual design of structures. To make use of the tables more effective, several illustrative design problems are included.

* * *

Heavy fabric with members in both directions up to ½ inch in diameter, permits the designer to

use prefabricated sheets of wire reinforcement to counteract stress in two directions. Most of the fabric in prior years has had heavy wires in one direction only, the wires at right angles being temperature steel and anchorage. It is just within recent years that the industry has developed machines capable of welding ½ inch diameter wires to each other.

* * *

In part two of the handbook are tables for one way slab design, with spans from 10½ to 21 feet in conventional concrete, and spans 10½ to 24 feet in lightweight concrete.

* * *

The two way flat slab tables, which afford the designer full use of heavy fabric's two way design capability, cover slabs of conventional concrete, and of lightweight concrete, both with and without drop panels, up to 26 feet square.

* * *

Also in the handbook are tables for designers of tilt-up concrete wall panels for 2 and 4 point pick-up design, in both conventional and lightweight concrete. Other tables cover design of vertically spanned basement walls, cantilevered retaining walls, and square individual column footings.

* * *

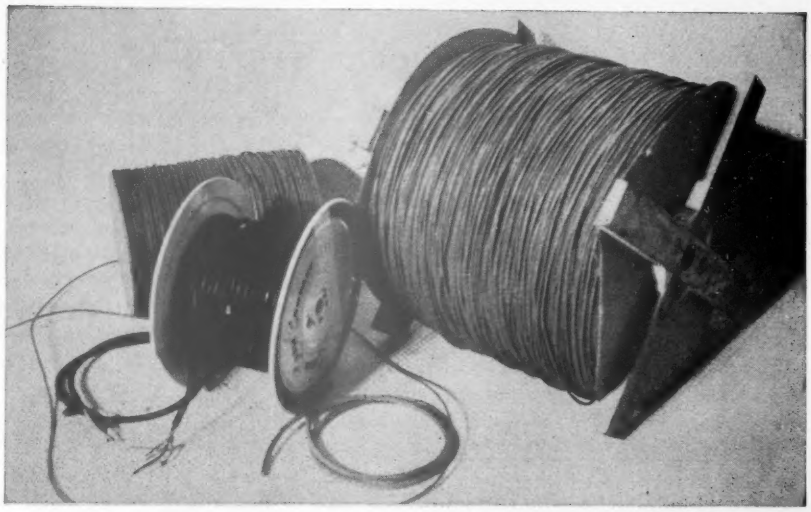
As an aid to the quantity take-off man, complete instructions are given on detailing and ordering welded wire fabric, including a sample framing plan and schedules.

* * *

The new handbook will be made available without charge to all bona fide inquirers, requesting it on an organization's letterhead. Address Requests to Dept. BH-70, Wire Reinforcement Institute, 1049 National Press Building, Washington 4, D. C.

Baird to Build Spring Machines

The Baird Machine Company announced recently a revolutionary new line of spring manufacturing machines following acquisition of the line from **The Clay Engineering and Manufacturing Co.**, Chicago, Illinois, according to an announcement by **Durwood A. Blaisdell**, Executive Vice President.



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TEXTILENE GLASCOR*

Soft, dry fillers for portable and flexible cords, Textilene Glascor and Twi-Port have wide acceptance. Fiberglas-centered Glascor is exceptionally strong without added bulk or sacrifice of pliability. It goes into S, SJ, and SV cords with 18, 16, and 14 gauge conductors — Twi-Port into S and SJ cords with 12 gauge and larger conductors. Successful applications include control, appliance, and power cables; telephone drop wire; communications and coaxial cables.

Twitchell's superior Textilene line also includes: Fungus-resistant filler — *Twi-Tar*. Used for buried communications cable, expanded ACSR cable, and in other applications.

Moisture-resistant fillers—*Twi-Flex* and *Twi-Wax*. Used for non-metallic sheathed cable, maritime shipboard cable, varnished cambric cable.

*Patent No. 2832190

For Every Wire and Cable Application
Twitchell's TEXTILENE Fillers Fill The Bill

Quality-controlled materials that are dependably uniform . . . in standard forms, or customized to special needs.

Initial low cost with savings added by production efficiency . . . flexible, ready-to-use fillers that fit all equipment, handle and form easily, always maintain desired shape.

Assured supply from a reliable domestic source . . . always available in economical and convenient packaging.

Proved performance as components of cables and wires that meet government specifications . . . stability shown by trouble-free installations in continuous service 20 years and longer.

FREE — SAMPLE SPOOLS of any type of Textilene filler to demonstrate the superiority of Twitchell materials in your operation—also technical counsel without cost or obligation. Just tell Twitchell your end-use requirements. *Write, wire, or phone today:*

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PAPER PRODUCTS FOR THE WIRE INDUSTRY

Twisted • Folded • Pressed • Crushed • Shaped • Braided • Woven

EFFICIENT, MODERN SYSTEMS FOR ELECTRICAL WIRE & CABLE MANUFACTURING

• *CABLE LACQUERING SYSTEMS*

Conventional cellulosic, or other type, lacquers are applied in successive continuous coats from one to twenty-eight coats over fibrous braid wrapped primary conductors. One end, four ends, or eight ends of wire are handled continuously. System includes letoff, application, drying and constant tension takeup equipment.

• *WIRE ENAMELING SYSTEMS*

Natural and synthetic enamels, silicones, solution nylon, modified plastisol, and similar insulating coatings are applied to bare, cotton or glass covered wire in round, square or rectangular cross section. Ten or twenty simultaneous strands are handled. Systems are complete with letoff, preannealer, application system, capstan and multiple takeup unit.

• *ASBESTOS INSULATING SYSTEMS*

Carded asbestos is applied to continuous single conductor as an integrated operation with saturating, rotary forming, drying, cooling and polishing of the finished wire. Wire from No. 20 gauge to No. 6 AWG is handled through an asbestos wall thickness range of from .008″ to .040″ thickness in a single pass.

• *RUBBER OR PLASTIC JACKETING SYSTEMS*

Rubber and thermoplastic jacketing compounds are continuously applied to electrical wire or cable by the extrusion method. High speed, constant tension letoff and takeup equipment, controlled cooling or continuous vulcanizing equipment are powered by synchronized range drives as complete, integrated wire handling systems. Extrusion machines of customer's choice are furnished.

• *GLASS & VARNISH COATING SYSTEMS*

Double layer of glass or cotton wrapping is applied to round, flat or square conductor. Two individual coatings of high temperature varnish are applied and the finish baked in a continuous operation. Units are complete from letoffs to takeup frames.

• *SELF TRAVERSING REEL CORD DRYERS*

These ingenious machines are used to remove hygroscopic moisture from fibers, braided or knitted flexible cable. These machines increase extrusion speeds, reduce blister scrap loss and improve diameter control. They are easily installed in existing extrusion line.

TECHNICAL INFORMATION ON ANY OF THESE PROCESSES UPON REQUEST

C. A. LITZLER CO., INC.

235-239 BROOKPARK ROAD

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Reports indicate that extensive market surveys were made which proved the need for the new machine which is capable of producing completed springs in a single operation as opposed to machines in current operation which merely coil the spring and require end forming operations to be performed on additional machinery. Mr. Blaisdell stated that they already have received substantial orders from many companies in the spring industry.

* * *

This new line complements Baird's present ribbon and wire forming machinery line of machines that they have been building for the wire and spring industries for over 100 years.

Nonotuck Appoints West Coast Representative

Nonotuck Manufacturing Company of Holyoke, Massachusetts, announces the appointment of the firm of **Thompson Associates** as its west coast sales representative.

* * *

Nonotuck, established in 1937, specializes in fine sizes of bunched, stranded, bobbin wound and single end copper wire — both bare and tinned.

* * *

Thompson Associates, located at Palos Verde Estates, California, is headed by **Richard R. Thompson.** In addition to acting as manufacturers representatives, its specialists offer a broad service as engineers and wire mill consultants.

Trial Kits

Spectra-Strip Wire & Cable Corporation announces an offering of their new wiring specialties in Kit form. This Kit includes the latest types of cable, including their new Spectra-Flex Retractable cable. Every item is new, practical, usable, and useful. They claim this Kit will start the Design Engineer thinking of new solutions to his hook up problems.

* * *

Details from **John Ford,** Sales Manager, Spectra-Strip Wire & Cable Corporation, P. O. Box 415, Garden Grove, Calif.

Outstanding Personalities of the Wire Industry

Davis-Standard Personnel Changes Announced

John R. Wheeler has announced his retirement as Vice President in charge of the **Standard Machinery Division** of Franklin Research And Development Corporation, Mystic, Conn. Mr. Wheeler's retirement, which became effective as of July 1st, was coincident with the appointment of several new positions in the Davis-Standard Division, sales organization for the Standard Machinery Company.

* * *

Philip C. Greene, former Sales Manager of Davis-Standard, has been named Division Manager, succeeding Mr. Wheeler. Other key personnel at the plant include: **Roger Lawton,** Manufacturing; **Alden Nelson,** Engineering; and **Maurice Morissette,** Accounting.

* * *

John McCormick has been appointed Sales Manager of Davis-Standard. He has been a sales engineer for the firm since 1957. **John R. Wheeler, Jr.,** a special sales engineer for wire insulating accounts, will service the territory formerly handled by Mr. McCormick.

* * *

Also within the Sales Department, **Dennis Deveau,** former Sales Office Manager, has been appointed Sales Product Manager for Wire & Cable Machinery; and **N. V. Fay,** Factory Sales Engineer, has been named Sales Product Manager for Plastics Processing Machinery.

Philip C. Greene

* * *

John R. Wheeler, Sr., will retain his position as Vice President and member of the Board of Directors of Franklin Research and Development Corporation. Davis-Standard and Standard Machinery Divisions are leaders in the development and manufacture of extrusion machinery for the plastics and rubber industries.

David B. Miller Retires

David B. Miller, Manager, Wire Rod and Bar Division of the **Aluminum Company of America,** Pittsburgh, retired from active duty in the company on August 1, 1960, after thirty-eight years of service to our industry.

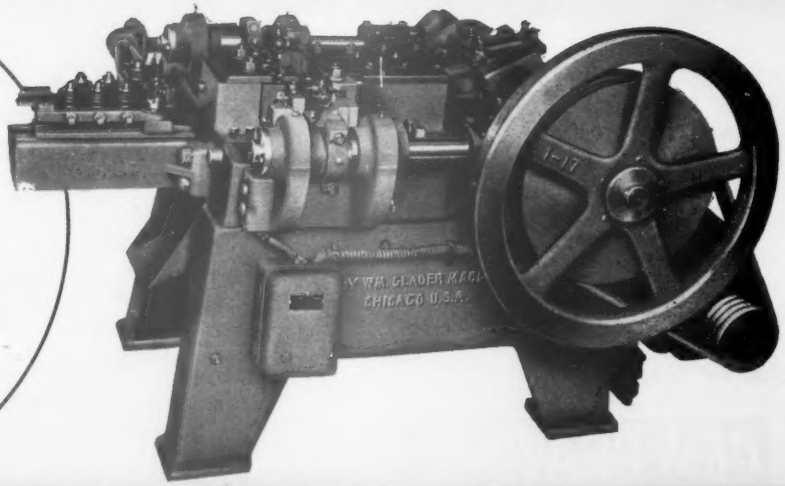
GLADER

HIGH SPEED WIRE NAIL MACHINES

HIGH TONNAGE OUTPUT—LOW MAINTENANCE COST

You can take care of increased production schedules and better product demands with these machines of established reputation.

For 55 years GLADER MACHINES have been giving HIGH QUALITY, LOW COST nail production.



Wm. Glader Machine Works 210 N. Racine Avenue Chicago 7, Illinois

Export Dept. 122 East 42nd Street -:- New York 17, N. Y.

Mr. Miller has been a member of **The Wire Association** since 1948 and was a familiar figure at our Annual Conventions. In his long identity with the wire field, Mr. Miller had developed many friends, who will both miss him and wish him well.

Engineer Joins Wirecraft

George W. Schmitt has joined the staff of **Wirecraft, Inc.**, Rolling Prairie, Indiana, as Chief Engineer. He is an electrical engineering graduate of the University of Detroit and has had many years experience in the manufacture of insulated wire and cable.

Fort Wayne Metals Names Didier Vice President

Frank B. Didier has been named vice president and treasurer of **Fort Wayne Metals, Inc.**, according to a report from **Ardelle Glaze**, president. Mr. Didier, who joined the Fort Wayne, Indiana firm in 1948 as an accountant, became Comptroller in 1949; and in 1958 he was elected to the FWM's board of directors.

* * *

The promotion of Mr. Didier as a company officer is reported to be the first of several executive appointments contemplated, following announcement in May that FWM will build a new 90,000 square foot stainless alloy wire making facility. The new facility, to be completed by 1965, begins with a 30,000 square foot "module" this summer.

Frank B. Didier

* * *

Mr. Didier is a member of **The Wire Association** and of the National Association of Purchasing Agents.

Opens Alabama Branch Office

Officials of **Indiana Wire Die Company**, Fort Wayne, Indiana, announce the opening of a new branch outlet in Fayette, Alabama. Known as the **Alabama Wire Die Company**, the new branch will be managed by **Phillip O. Taylor**, a lifetime resident of Fayette. Mr. Taylor will also carry on a program of research and development in new wire drawing techniques for this rapidly changing industry.

* * *

The location will enable the Company to provide prompt close-by service to both new and old

Marking Machines, Wheels & Inks

FOR INSULATED WIRE, TUBING AND PIPE—

Type VDM — Illustrated has these Features:

1. Use present towers, no changes necessary.
2. One filling of ink well, gives 18 HOURS of continuous simulated spiral striping, number coding or printing.
3. For single or double marking or hash mark striping.
4. Constant wiper pressure.
5. Diam. range .032 thru 1½".

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IN THE MARKING OF EXTRUDED MATERIAL THERE ARE BIG ADVANTAGES IN ONE SINGLE SOURCE OF SUPPLY.
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customers, several of whom have been regular users of its products and services for many years.

* * *

Alabama Wire Die Company will stock complete lines of diamond dies in all standard sizes and types and will also provide skilled recutting service.

* * *

In business for over thirty years, Indiana Wire Die Company is well known throughout the wire drawing industry, having enjoyed the continuing patronage of its leading producers.

Mark Wolf to Head R & D For Rea Magnet Wire

E. Mark Wolf has been named technical director of **Rea Magnet Wire Company, Inc.,** division of Aluminum Company of America, according to **R. L. Whearley,** Rea executive vice president and general manager.

* * *

In his new capacity, Mr. Wolf will head Rea's recently expanded research and development activities, which include projects concerning round copper and aluminum magnet wire, and aluminum sheet and foil strip conductors.

* * *

Most recently assistant chief engineer of Alcoa's Rome Cable division, Mr. Wolf is an electrical engineering graduate of Cornell University. He joined Rome in 1941, after prior employment with the U. S. Merchant Navy and American Steel & Wire Company, and as a civilian engineer with the U. S. Army Signal Corps.

E. Mark Wolf

* * *

With Rome, he served as an electrical engineer and subsequently in various engineering supervisory capacities, prior to his appointment as assistant chief engineer in 1954.

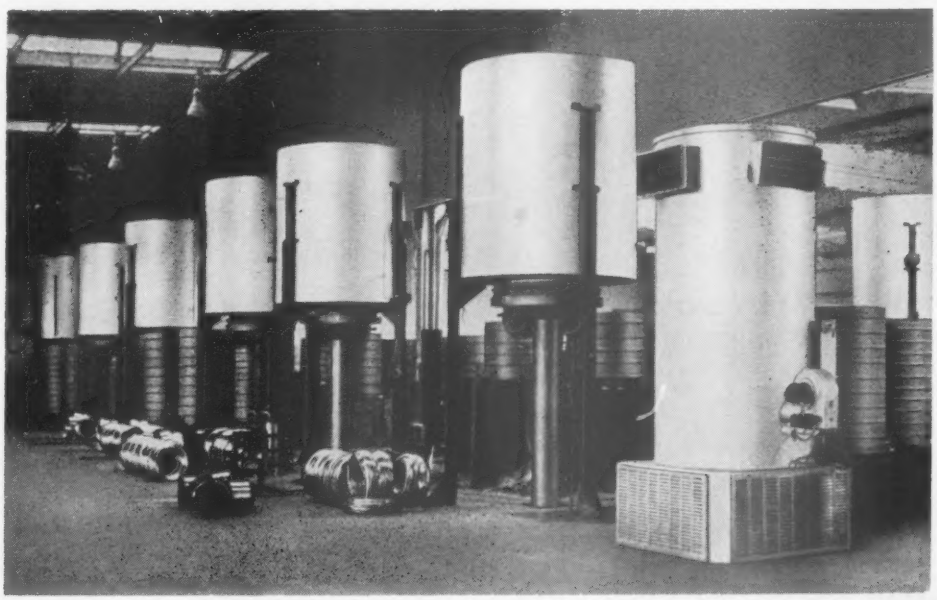
Jasper Heads Manco Mfg. Co.

Evans Jasper, formerly Vice President of **Manco Mfg. Co.,** Bradley, Illinois, has been made President of this hydraulic tool and equipment firm. He continues as President of Manco's subsidiary, Timperline Equipment Company, also located in Bradley.

* * *

T. N. Hemstreet has moved from Comptroller to Assistant Treasurer of Manco and has also been appointed Secretary-Treasurer of Timberline. **D. W. Jasper** remains Chairman of the Board and Treasurer at Manco.

THE LAST WORD IN MODERN EFFICIENT DESIGN!



SEVERAL VACUUM BRIGHT ANNEALING UNITS WHICH WE HAVE INSTALLED IN ONE OF THE MOST PROMINENT CABLE WORKS IN GERMANY

(German and Foreign Patents)

*

SOLE REPRESENTATIVE:
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OFENBAU **FRITZ** G. m. b. H. & Co. K. G. **HAGEN,** (W.-GERMANY)

Appointed by Hitemp

Francis X. Buschman was appointed director of research, development and engineering for this Westbury, N. Y. concern.

* * *

Prior to joining Hitemp, Mr. Buschman was vice president in charge of operations for **Tensolite Insulated Wire Co.** and from 1952 to 1956 was general manufacturing superintendent of **Flexo Wire Division,** of Copperweld Steel Co.

Heads Cleveland Crane

Herbert T. Florence, who started with the company as an apprentice 37 years ago, has been elected President and General Manager of **The Cleveland Crane & Engineering Co.,** Wickliffe, Ohio. He succeeds **Charles F. Safreed** who has been made Chairman of the Board.

* * *

Also advanced were **William J. Ryan,** who became Vice President and Assistant General Manager; and **Ralph Ford,** Plant Superintendent, who was made Assistant Secretary, in addition to his present position.

* * *

New directors to the Board are **Edward J. Jenkins,** Controller, and **Richard A. Michelson.** Others on the Board, in addition to all named above, are **Albert S. Michelson, Dudley W. Maxon** and **T. Henry Williams.**

Herbert T. Florence

Since the company became a subsidiary of The McNeil Machine & Engineering Co. in 1949, Mr. Florence was Executive Vice President and General Manager of Cleveland Crane and a Director of McNeil.

Ensign Named Research Director By Elgin Watch

The appointment of **George G. Ensign** as Director of Corporate Research and Development of the Elgin National Watch Company has been announced by **James G. Shennan,** president.

* * *

He joined Elgin in 1936 as chief engineer of the power plant and of the plant maintenance division and has been manager of Watch Manufacturing since 1958. His new duties will include coordination and supervision of the separate research and development programs maintained by Elgin's four operating divisions, Abrasives, Electronics, Micronics and Watch. In addition, he will direct corpo-

LOW COST precision wire plating

MAINTAIN UNIFORM COATINGS AT HIGH SPEEDS!

CONTINUOUS ELECTROPLATING EQUIPMENT

This low cost equipment performs with ease and efficiency that mean real savings. Preset quality control insures perfection without depending on operators' skill. No toxic fumes, clean operation at low temperature, elimination of work hardening during processing and many other features are the result of experience and sound engineering that go into the design of all Universal equipment.

We furnish complete installation . . .
For further information write to:

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SECAUCUS, NEW JERSEY SOLE AGENT IN CANADA: E. V. LARSON CO., LTD., TORONTO, CANADA

U. S. PATENT #2823180 AND FOREIGN PATENTS PENDING

rate research and development activities leading to new products and processes.

* * *

He received his degree in mechanical engineering from Iowa State College. After working for the Western Electric Company as a manufacturing engineer, he returned to Iowa State for his master's degree.

Chase Brass Promotes Andrews

Appointment of **David M. Andrews** as Director of Production Planning and Control for **Chase Brass & Copper Co.,** a subsidiary of Kennecott Copper Corporation, was announced by **Gilbert R. Boutin,** Vice President-Operations. His appointment to this staff position became effective August 1.

* * *

Mr. Andrews served with the Army Ordnance during World War II. He came to work for Chase in June, 1950, and since that time has held a number of supervisory positions at Chase, the last being that of General Superintendent of the Chase Metal Works plant in Waterville, Conn. He is a graduate of Columbia University.

Triangle Appoints Power Cable Manager

The appointment of **Thomas R. Ryan** to the position of Manager, Power Cable Division for **Triangle Conduit & Cable Co., Inc.,** New Brunswick, N. J., was announced by **C. S. Menger,** Executive Vice President. In his new capacity, Mr. Ryan will be available to consult, advise and assist Utilities, Contractors, Consulting Engineers and Distributors, on a technical basis, with their wire, cable and conduit problems. He will also be responsible for managing the efforts of Triangle's Application and Sales Engineers.

* * *

Mr. Ryan was formerly the Triangle Northeastern United States Wire and Cable Sales and Application Engineer. He has a wealth of wire and cable know-how as a result of his vast and outstanding background. Mr. Ryan was at one time associated with the **American Steel and Wire Division,** U. S. Steel Corporation, as an Electrical Wire and Cable Sales Engineer to Utilities and Consulting Engineers. He is a graduate of Pratt Institute.

Appointments at Atlantic Wire

William E. Hitchcock, Jr., President of **The Atlantic Wire Company,** Branford, Conn., has announced a number of appointments as follows: **Elmer S. Tyler, Jr.,** to Manager of Sales, as of July 1, 1960; **Renato Rodriguez** has been made Product Control Manager, assuming the duties formerly performed by Mr. Tyler; and **H. William Waters** has been appointed Production Manager.

Appointed to Key Sales Post

Gordon I. Donovan has been appointed Director of Sales of the Copper Rod and Brass Products Division, **Triangle Conduit & Cable Co., Inc.,** New Brunswick, N. J.

the latest HIGH SPEED
TUBULAR STRANDING MACHINE
from HANSON & EDWARDS . . .

. . . for the cable and wire rope industries.

19-12½ bobbin machine, one of the new models now in production. The capstan unit, with cantilever mounted haul-off sheaves, is a complete separate unit coupled by shaft and flexible coupling to the main machine.

* External wire guides increase efficiency—reduce "down-time"—provide quick, easy threading.
* Overall dimensions reduced—increased speed.
* Electro-mechanical or electrically operated air brakes to choice.
* Rotor runs in large split roller bearings.
* Direct gear-driven capstan gives positive lays.

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P5078

The announcement was made today by **Carl S. Menger,** Executive Vice President. Mr. Donovan was formerly Triangle's Manager of Brass Sales. In his new post, he will supervise and direct all activities pertaining to his division.

* * *

Since joining Triangle in 1945, Mr. Donovan has been instrumental in the design and development of Triangle's highly automated Copper Rolling Mill, one of the most modern in the industry. It is felt that his many years of experience with copper and brass products and his familiarity with basic metals should prove a valuable asset in assisting customers in their production and technical developments.

* * *

After attending Baltimore Polytechnic Institute and Johns Hopkins University, he joined the Baltimore Copper Works as a Research Engineer in 1928. Subsequent posts include Superintendent of Wire, Rod and Casting at **General Cable Corp.,** Perth Amboy, and Vice President in Charge of Operations at **Volco Brass and Copper Company.**

Gordon I. Donovan

* * *

Mr. Menger also announced the appointment of **Lawrence H. Waldman** to the position of Assistant Director of Sales of the Division. He previously was Assistant to the Director of Purchasing.

Heads Sunbeam Equipment

Vincent R. Troglione has been elected President of **Sunbeam Equipment Corporation,** succeeding **H. C. Gwinn,** who has been named Chairman of the board of directors. Mr. Troglione was Vice President and General Manager of the Meadville Industrial Furnace Company before becoming its President.

* * *

Mr. Troglione is a member of the Association of Iron and Steel Engineers and is a registered professional engineer in Pennsylvania. He is well known in the Industrial Heat Treating Field.

Carpenter Steel Promotes Indianapolis Man

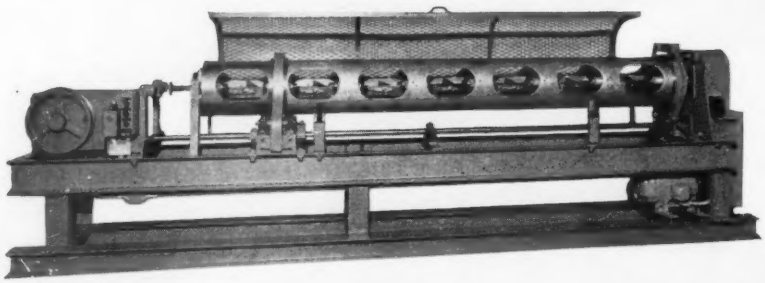
The Carpenter Steel Co., Reading, Pa., has named **William J. Ervin** as assistant to its Midwestern Regional Manager, to work out of the Indianapolis office and warehouse at 1618 W. Washington St., Indianapolis. Carpenter makes

SEVEN BAY
HIGH SPEED
STRANDER

MODEL 7 B 55

This precision, perfectly balanced machine features: rigid steel box structure-barrels of high strength ALCOA alloy — motor mounted below center of gravity — safe, positive drive — push button controls— carbide wire guides — interchangeable cradle assemblies — standard cradles taking 7" diam. X 4" Traverse Spools — 30 lengths of lay.

BARTELL FOR THE BEST



• CATERPILLAR CAPSTANS • SINGLE & MULTIPLE HEAD RESPOOLERS • WIRE STRANDERS
• TAKE-UP & PAY-OFF STANDS FOR PLATING EQUIPMENT

BARTELL MACHINE-TOOL CORP.
YACHT CLUB ROAD ROME, N. Y.
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WE ALSO DESIGN AND BUILD SPECIAL EQUIPMENT TO MEET SPECIFIED REQUIREMENTS

specialty stainless, tool, and alloy steels.

* * *

Prior to this appointment, Mr. Ervin was a Branch Manager, then District Manager in the Indianapolis office.

Elgin Appoints Diamond Products Field Engineer

The Abrasives Division of **Elgin National Watch Company** has announced the appointment of **Richard Hart,** Hamilton, Ohio, as a Direct Field Engineer for the diamond products of the Division.

* * *

Mr. Hart, who will be responsible for distributor sales as well as direct sales, will cover the Dayton-Cincinnati section of Ohio as well as Eastern Kentucky, Eastern Tennessee and the state of Georgia.

Hubbard Spool Name Change

L. A. Hubbard, Controller, **Hubbard Spool Division,** and **W. R. Parshall,** Treasurer, **Van Norman Industries, Inc.,** have jointly announced that as a result of the merger of **The American Pulley Co.,** into Van Norman Industries, Inc., the name of the division has become **Hubbard Spool Division of Van Norman Industries, Inc.**

* * *

The Hubbard Spool Division, the country's largest manufacturers of reels and spools of all types, will continue to operate as before at Garrett, Indiana, except that it will have the benefit of the larger engineering, marketing and research facilities of the new parent organization for even better customer service. A new telephone number also was announced: FLeetwood 7-5141.

Cable Firm Buys Machinery Business

Charles F. O'Rourke, President of **Jordan Wire & Cable Co.,** Jordan, N. Y., has announced the purchase of **C. F. O. Industries, Inc.,** a wire machinery manufacturing and leasing firm, to broaden and diversify the company's interests.

* * *

Mr. O'Rourke also announced at the same time that he had disposed of his holdings in the **Owl Wire & Cable Co.,** Syracuse, N. Y., and the **Carolina Wire & Cable Co.,** Farmville, N. C., to devote his full energies to new products being developed for both his company and C.F.O. Industries.

Carl H. Judish

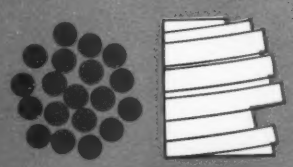
Whitney Blake Company, New Haven, Conn., has announced with deep regret the passing on July 9, 1960, of **Carl H. Judish,** their Chief Plant Engineer.

* * *

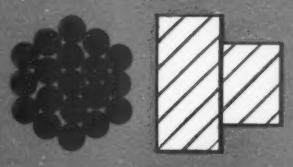
Mr. Judish, who had become a member of **The Wire Association** in 1943, had been affiliated with the Whitney Blake Company for the last eighteen years.

The 1960 BUYERS' GUIDE
Have you ordered your copy?
Price: $5.00

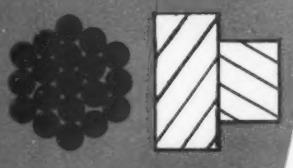
Which Wire Construction is Best . . .



BUNCH



UNILAY



CONCENTRIC

Hudson makes all three in bare and plated constructions. Each is best suited for particular applications and insulating materials. For many years, the industry "standards" were bunch and concentric strandings. But with Hudson's marketing of unilay, there has been a strong swing to this versatile construction.

. . . for your Application

BUNCH constructions are generally used for flexible cords and fixture wires complying with UL standards, ASTM, and all military specs where permitted.

UNILAY constructions should be utilized where concentricity is a major requirement, or for economic reasons to get more for your insulating dollar. Since unilay constructions are preformed and twisted in the same direction, they are uniform and smaller in O.D. than bunched or concentric constructions. Unilay constructions are suited for all bunched applications, and are being substituted for concentrics in many applications with comparable performance at considerably lower conductor cost.

CONCENTRIC Where concentric strand conductors are required by customer or military spec, Hudson's concentric wires will meet the most exacting requirements.

For additional information on stranded and single-end conductors — bare and plated — write to:

HUDSON WIRE COMPANY
OSSINING DIVISION, OSSINING, NEW YORK / TELEPHONE: WILSON 1-8500

A Review of Recent Wire Patents

The data listed below is only a brief review of recent patents pertinent to the readers and subscribers of this publication.

Complete copies of these patents may be obtained by writing to the publisher of this magazine and remitting 50c for each copy desired. For orders received from outside the United States the cost will be $1.00 per copy.

No. 2,943,598 — WIRE COATING APPARATUS, patented July 5, 1960 by Walter H. Newton, Owensboro, Ky., assignor to General Electric Company, a corporation of New York.

The coating solution is drawn from the solution reservoir through an outwardly and downwardly extending notch in the reservoir walls, through which the wire is also drawn, so that the solution is agitated in the notch and the wire does not contact the walls of the notch.

* * *

No. 2,943,741, SHOE RACK, patented July 5, 1960 by Truman L. Atkinson, Ludington, Mich., assignor to Atkinson Manufacturing Company, Inc., Ludington, Mich., a corporation of Michigan.

This rack is formed mainly of wire, bent to form a number of shoe retaining supports. Five claims.

* * *

No. 2,944,312, PIN FASTENER, patented July 12,1960 by Franklin R. Lacy, III, 926 Raleigh Road, Glenview, Ill.

The pin fastener is constructed of a single length of wire and a guard portion bent over one end of the wire and adapted to releasably retain the point portion of the fastener.

* * *

No. 2,944,380, WIRE TWISTING MACHINE, patented July 12, 1960 by John J. Klapper, New Canaan and Claude C. Smith, Jr., Stratford, Conn., assignors to General Electric Company, a corporation of New York.

The principal object of this invention is to provide a machine which is capable of whirling the twisted wire directly into a spinning barrel take-up mechanism to reduce the tension which is applied to the wire.

* * *

No. 2,944,584, WIRE FORMING APPARATUS, patented July 12, 1960 by Ralph Calmy, Las Vegas, Nev., assignor, by direct and mesne assignments, to Dannie O. Malafouris, Portland, Ore.

Coiling of the wire is effected by means of a spiral die associated with electro-mechanically clutch and lock operating means.

* * *

No. 2,944,679, WIRE DISPLAY RACK, patented July 12, 1960 by Harry J. Rubenstein, 816 W. 69th Terrace, Kansas City, Mo.

The rack is constructed wholly of wire comprising an upright standard and a tray extending forwardly therefrom.

* * *

No. 2,944,745, TOROID WINDING APPARATUS, patented July 12, 1960 by John W. C. Bassett, Johnson City, N.Y., assignor to General Electric Company, a corporation of New York.

A machine for winding miniature toroids is disclosed comprising a hollow, circular shuttle, having a smaller outside diameter than the inner diameter of the toroids to be wound thereon, winding wire enclosed by the shuttle, a shuttle eye for removing the wire from the shuttle to the toroid, a device securing one end of the wire to a stationary portion of the machine to thereby suspend on the winding wire a toroid to be wound, and means for revolving the shuttle through the toroid.

* * *

No. 2,944,746, APPARATUS FOR TAKING UP AND SUPPLYING STRAND MATERIAL, patented July 12, 1960 by Samuel M. Martin, Lutherville, Md., assignor to Western Electric Company, Incorporated, New York, N.Y., a corporation of New York.

This apparatus is adapted to accumulate and supply strand material, so constructed that when an amount of the material is being removed from one accumulating means a proportionate amount of material is accumulated by another accumulating means.

STRANDING ?

ALL TYPES OF STRANDING MACHINERY FOR ELECTRIC CABLE & WIRE ROPE INDUSTRIES — RIGID MACHINES, TUBULARS, LOCKED COIL OR HALF-LOCK MACHINES.

SEND US YOUR PROBLEMS OR ENQUIRIES.

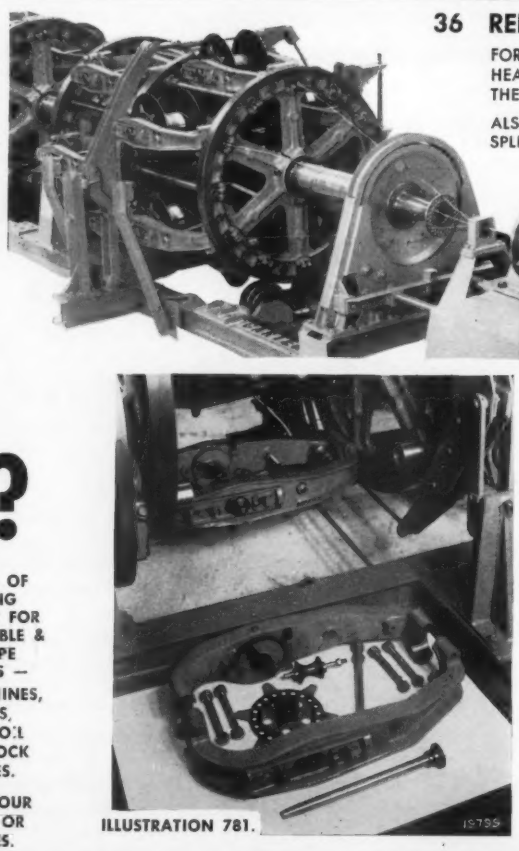


ILLUSTRATION 781.

36 REEL PLANETARY STRANDING MACHINE

FOR 16" OR 405 M.M. REELS. FITTED WITH TWO COMPACTING HEADS FOR ROUND STRAND. FOR COMPACTING TO 90% OF THE ORIGINAL DIAMETER ON COPPER OR ALUMINUM.

ALSO SHOWN IN ILLUSTRATION 781 ARE THE FAMOUS "CARTER" SPLIT CRADLES FOR EASY MAINTENANCE & ASSEMBLY.

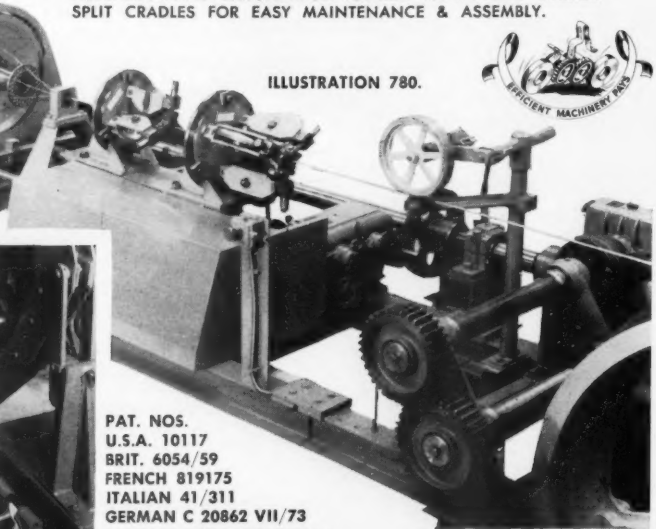


ILLUSTRATION 780.

PAT. NOS.
U.S.A. 10117
BRIT. 6054/59
FRENCH 819175
ITALIAN 41/311
GERMAN C 20862 VII/73

MACHINERY DIVISION.

B. & F. CARTER & CO. LTD.

ALBION WORKS, BOLTON 6, ENGLAND
ELECTRIC CABLE, BRAIDING & WIRE ROPE
MACHINERY OF EVERY DESCRIPTION
TEL: BOLTON 4344 GRAMS: "BRAIDERS BOLTON"
Representative in U.S.A.:
R. H. Richman, Preci-Matic Corp., 60 E 42d St., New York 17, N. Y.

No. 2,944,747, TENSION CONTROLLER, patented July 12, 1960 by Joseph A. Miller, Stillwater, Minn. assignor to Minneapolis-Honeywell Regulator Company, Minneapolis, Minn., a corporation of Delaware.

An electrical sensing unit is employed, such as a differential transformer, and provides an instantaneous response of the winding machine.

* * *

No. 2,944,758, WIRE PACKAGE AND SUPPORT, patented July 12, 1960 by John G. Wright, James M. Chafin, and George M. Wynn, Atlanta, Ga., assignors to The Auto-Soler Company, a corporation of Georgia.

More specifically the invention relates to wire fastener forming and inserting machines in which particularly heavy wire is utilized.

* * *

No. 2,944,759, WIRE STAND, patented July 12, 1960 by Gordon I. Donovan, Plainfield, N.J., assignor to Triangle Conduit & Cable Co., Inc., New Brunswick, N.J., a corporation of Delaware.

It is stated that relatively large amounts of wire can be transported by this stand and the wire readily dispensed at the point of use. The wire may be soft wire of steel, bronze, brass and the like.

* * *

No. 2,945,265, METHOD FOR MAKING INSULATED WIRE, patented July 19, 1960 by John Sell, Jr., Robert W. Anderson, and Leonard H. Murray, Wallingford, Conn., assignors to Revere Corporation of America, Wallingford, Conn., a corporation of New Jersey.

The method is adapted for applying to the wire a vari-colored insulating coating of polytetrafluorethylene material and the like.

* * *

No. 2,946,535, APPARATUS FOR WINDING AND COILING WIRE, CABLE AND THE LIKE, patented July 26, 1960 by Kenneth O. Marion, 19797 Whitcomb Ave., Detroit 35, Mich.

Tight coils of wire may be wound and held in place while being coiled.

* * *

No. 2,946,536, PAY OFF REEL FOR WIRE OR THE LIKE, patented July 26, 1960 by Gustave H. Froelich, Torrington, Conn., assignor to The Torrington Manufacturing Company, Torrington, Conn., a corporation of Connecticut.

The reel comprises a drum on a frame, an annular basket connected with the drum for rotation therewith and adapted to support a coiled bundle of wire, guide means for receiving and guiding wire from the basket to the periphery of the drum for passage therearound, and a device for retarding rotation of the drum and the basket when wire is pulled from the drum.

TO SELL — ADVERTISE IN
WIRE AND WIRE PRODUCTS
It pays — send for rates
453 Main St., Stamford, Conn.

Thompson to Represent Gillies

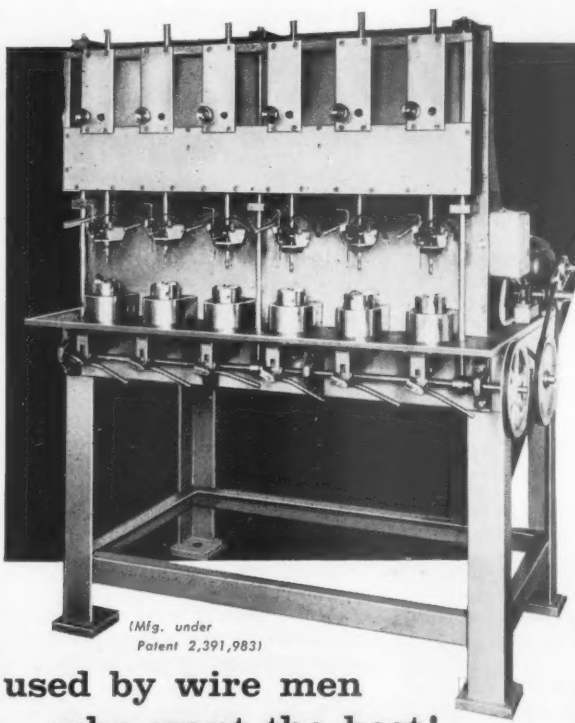
Duncan M. Gillies Co., West Boylston, Mass., has announced the appointment of **Thompson Associates**, P. O. Box 1143, Palos Verdes Estates, Calif., to represent the firm on the West Coast in the sale of its printing wheels and machines for insulated wire and hose.

New Polymers — New Problems

The paper of the above title was the Edgar Marburg Lecture, presented by **Herman F. Mark** at the Sixty-Second Annual Meeting of ASTM.

* * *

In it Dr. Mark discusses current problems in the polymer field and their behavior properties that man attempts to exploit in the development of new materials. He refers to polymers in a broad sense — natural and synthetic, purely organic or partly inorganic. Polymers, he maintains, are of immediate



used by wire men
who want the best!

Sjogren
AUTOMATIC
DIE SIZERS

Another SJOGREN-BUILT Machine for "wire men who want the best!"

This Automatic Die Sizing Machine is available in 2 models — the Six Spindle (as shown) and the Single Spindle unit. Both models are identical in construction and the same production per spindle applies. Typical production per spindle, per hour, on the six spindle machine is:

2 dies at .165"	8 dies at .082"
4 dies at .135"	10 dies at .072"
6 dies at .095"	15 dies at .062"

(Total of 45 dies or more, per hour)

DISTRIBUTORS

BRONSON & BRATTON, INC.
5161 South Millard Avenue
Chicago 32, Ill.

GLEN CARBIDE, INC.
704 Second Avenue
Pittsburgh 19, Penna.

Sjogren TOOL & MACHINE CO., INC.
14 Sword St.
AUBURN, MASS.

WIRE PULLERS • WEDGE GRIPS • JAWS FOR ALL MAKES OF PULLERS AND TESTING MACHINES • GAGE ROLLERS • SWAGING HAMMERS • POINTING DIES • WIRE SPOOLERS

practical interest as they are the basis of fibers, films, plastics, rubbers, coatings and adhesives.

* * *

Copies may be obtained from the **American Society for Testing Materials**, 1916 Race Street, Philadelphia 3, Pa., at $1.00 each.

R. I. Spring Products Acquires Hultgren

Rhode Island Spring Products, Inc., Mutual Street, Providence, R. I., manufacturers of springs and formed wire products has announced the change of ownership and the corporate name of the **O. W. Hultgren Mfg. Co.** No changes in operating personnel are planned. All product lines of the Hultgren organization will be continued. Projected plans include expansion and modernization of production facilities to assure prompt quality service in the manufacture of springs and wire forms for the metal working industry.

* * *

Paul J. D. Baltzer, for the past 8 years manager of the Hultgren firm, has been made Vice President and General Manager.

To Represent Carol Cable In South

The firm of Dupont-Bondurant of New Orleans, Louisiana, has been appointed by the **Carol Cable Company**, a division of **The Crescent Company** of Pawtucket, R. I., as its representative for Louisiana and Mississippi. Announcement of the appointment was made by **Kenneth R. MacLean**, Carol's Vice President-Sales.

* * *

Headed by **Eugene Bondurant** and **Lawrence Dupont**, the firm has its headquarters at 717 Jefferson Highway, New Orleans. It will warehouse the complete line of Carol portable cords, power supply cables, welding cable, cord sets and other Carol products, in New Orleans.

Alcoa Drops Term "Pig"

Completion of a program designed to improve the quality of aluminum produced for customers at its primary smelting locations, and abandonment of the term "pig" as a designation for primary aluminum products, was announced recently by **Aluminum Company of America.**

* * *

Alcoa Vice President **L. P. Favorite** said that improved production techniques now make possible the offer of a more highly refined, superior quality basic product with no increase in price to the consumer, and primary metal heretofore designated as "pig" will now be referred to as aluminum ingot.

Isoloy Made Available In Three Types

Isoloy spring wire has been made available in three popular types of stainless steel. This extremely uniform spring wire is now produced in Types 302, 304 and 316. Isoloy stainless steel is a product of **Riverside-Alloy Metal Division**, H. K. Porter Company, Inc., Riverside, N. J.

2500 LBS. OF WIRE AN HOUR
are handled in this Ajax salt bath patenting quench in a prominent Midwestern plant. This output compares with 800 lbs. obtained with previous method using a furnace of the same size!

Here's maximum speed, accuracy and economy in Wire Patenting!

No other method offers so many possibilities for quality improvement and cost reduction in the patenting of high- and medium-carbon steel wire or rods. Automatic temperature control—an inherent result of Ajax internally-heated salt bath furnace design—provides continuous accuracy within ±5° F. throughout the bath. You are thus assured of the uniformity so vital to obtaining proper tensile strength and grain structure.

More poundage can be handled. Savings up to 30% in pickling time are common. Salt residue is easily removed by a water wash. The entire patenting process lends itself readily to inexpensive automation. Maintenance is negligible. Long-life, immersed-type electrodes can be changed in an hour or two—without tearing down furnace or pot. Pots last indefinitely.

AJAX
HULTGREN
SALT BATH FURNACES
Internally heated electric and gas-fired types

WRITE FOR AJAX CASE HISTORY BULLETINS ON: ☐ Patenting; ☐ Process Annealing; ☐ Descaling; ☐ Cleaning, Preheating, Fluxing.

AJAX ELECTRIC COMPANY 928 Frankford Ave., Philadelphia 23, Pa.
VISIT AJAX, Booth 717, Metal Show, Philadelphia, Oct. 17-21

Isoloy was announced as a trade name for Riverside-Alloy's stainless steel spring wire last March. The new trade name was created to climax a series of uniformity improvements in the product, which had been taking place over a period of several years.

* * *

In addition to Isoloy, the Porter division also produces spring material in phosphor bronze, nickel silver, brass, Monel, Inconel, Inconel "X" and Duranickel — one of the most complete lines of spring materials in the United States.

Fine Alloy Wires For Satellite Program

Fine wire from nickel chromium and cobalt chromium alloys appears the most immediately suitable of a number of materials studied for the manufacture of high-temperature fabrics for reentry parachutes in manned satellites, acording to a report of research from the Air Force released through the Office of Technical Services, Business and Defense Services Administration.

* * *

Some of the materials tested may prove suitable for other uses where extreme strength and operational capability at temperatures up to 1,500°F are required.

* * *

The report, PG 161411 Candidate Materials for High Temperature Fabrics, may be ordered from OTS, U. S. Department of Commerce, Washington 25, D.C., $3.

Blank "Write-On" Markers And Labels

E-Z Code self-adhering "write-on" markers and labels provide on-the-spot marking in production and maintenance operations.

* * *

They are used as special wire or cable markers, as an instruction, inventory, product and component marking label or for miscellaneous marking or labeling requirements.

* * *

Write-on's are made from mil-spec fungus resistant Vari-Temp Cloth in a variety of die-cut sizes on handy dispenser cards ready for application.

* * *

Can be applied to any clean surface, yet removed cleanly if so desired when the job is done. "Write-on" labels can be marked with pen, pencil, ballpoint or typewriter.

* * *

A free set of samples and literature is available on request from **Westline Products**, division of Western Lithograph Co., 645 East 2nd St., Los Angeles 54, Calif.

Techalloy Adds R & D Laboratory

Techalloy Company, Rahns, Pa., announces new 4,000 square foot Research and Revelopment Laboratory for its expanded strip production facilities. Equipment has been engineered and installed to help in the application of high nickel alloys to customers applications. Work can be done on corrosion problems, high temperature

What's your problem?
MAYBE WE CAN HELP!
We design and make many things besides spools. The carefully selected personnel in our Research, Development and Engineering Departments came from within the wire industry and know its problems. Why not tap this experience for your own use?
WHAT KIND OF A SPECIALTY DO YOU NEED?
• Special equipment?
• Specially designed machinery?
• A fabricated piece you can't get anywhere else?
• Experimental and development work?
Write or call us today
Acrometal makes a complete line of precision aluminum (and steel) spools for processing and shipping fine wire. Also disposable reels and packages up to 1,000 lbs. capacity.
ACROMETAL PRODUCTS, INC.
616 Fifth Street N., Minneapolis 1, Minn.

applications, magnetic and electrical problems along with electronic applications and specialized problems that might even remotely involve any of the following: Monel, Nickel, Inconel, Inconel "X", Stainless and Heat Resisting Steels, Electrical Resistance Alloys and Glass Sealing Alloys.

Bulletin On New Type High Strength Bolt

Savings of up to 40 per cent in bearing-type connections can be achieved through the use of a new high strength bolt described in a four-page bulletin published by **Russell, Burdsall & Ward Bolt and Nut Company.**

* * *

Larger head and shorter thread length of the new bolt design offer substantial advantages: For erectors — savings in fastening time and materials cost; for fabricators — faster and less expensive production; for designers — specified shear strength with reduced number of bolts.

* * *

With large bolt heads, the increased bearing surface allows one of the two hardened washers normally employed in bolted construction to be eliminated. Shorter thread length — and exclusion of the threaded section from shear plane — increases allowable shear loading and permits two bolts to replace three bolts or three rivets in bearing-type connections. On a typical 18-bolt splice, replacing conventional bolts with large head high strength bolts permits eliminating six holes, six bolts, six nuts and 24 hardened washers.

* * *

The new bolts have been approved by the Research Council of Riveted and Bolted Structural Joints and by the American Institute of Steel Construction. For the designers convenience, the bulletin also contains excerpts from the latest ASTM specification for A325 bolts for structural joints.

* * *

Copies of the bulletin can be obtained from Russell, Burdsall & Ward Bolt and Nut Company, 100 Midland Ave., Port Chester, N. Y.

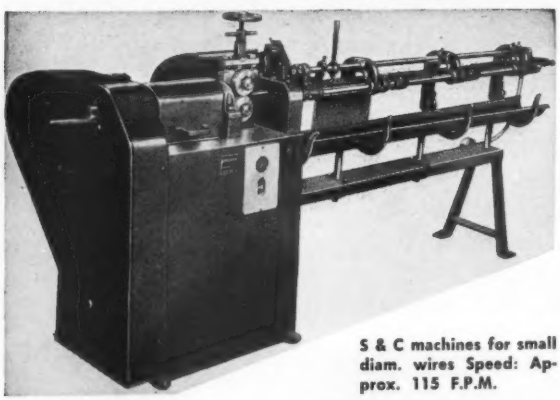
Baird Announces New Marketing Plan

The adoption of a new marketing and distribution program which will completely reorganize its current dealer sales organization, has been announced by the Barrel Finishing Equipment Division of **The Baird Machine Co.,** 1700 Stratford Ave., Stratford, Conn.

* * *

The new plan calls for the appointment of a selected group of 21 major distributors to the metal finishing field in key marketing centers. These organizations will be designated as Selected Distributors and operate on a completely exclusive basis within their sales territories. In addition, Selected Distributors will stock Baird barrel finishing equipment, perform test processing of samples, and have in their employ at least one thoroughly trained expert in tumbling operations. In addition, Selected Distributors will have the right to appoint sub or Franchised Distributors in their areas.

New! Improved! Fast!
WELLS STRAIGHTENER & CUTTER



S & C machines for small diam. wires Speed: Approx. 115 F.P.M.

This completely redesigned line combines maximum efficiency with that rugged dependability, for which WELLS S&C machines have become justly famous.

Built in several sizes to handle 2 to 18 ga. basic and high carbon wire.

FEATURES

The guide bar of these new machines can be supplied for any cut lengths • The rotary flier runs on ball bearings for smoothness and long life • Cut-off is actuated by a solenoid for extreme accuracy of cut lengths • A two point cam construction provides a quick and positive return of the cut-off knife, eliminating the need for a clutch and dog • A counter is standard equipment.

A COMPLETE RANGE OF S & C MACHINES
IS MADE BY WELLS FOR ALL SIZES OF WIRE.
SEND FOR CATALOG ON THE COMPLETE LINE.

Frank L. Wells Company

Builders of Fine Wire Working Machinery

5821 FIFTH AVENUE • KENOSHA, WISCONSIN

New Building Wire Development

An important advance in the building wire field was announced by **Triangle Conduit & Cable Co., Inc.,** New Brunswick, N. J. Called Thermo-Triex, the new wire is a non-metallic sheathed cable utilizing for the first time, a plastic outer covering. The individual conductors will continue to be insulated with polyvinylchloride compound and color coded according to industry practice.

* * *

Advantages over the braided type non-metallic sheathed cable include elimination of flaking, greater flexibility, easier pulling and stripping, increased resistance to abrasion, flame and moisture. In addition to being cleaner to handle, the above advantages should result in savings both in time and labor. Thermo-Triex will replace the company's current line of braided non-metallic sheathed cable beginning immediately.

* * *

Triangle Conduit & Cable Co., Inc., is a major producer of building wire, cable, conduit, copper tube and plastic pipe, copper and brass rod and wire products. Plants are at New Brunswick, N. J., Moundsville, W. Va., and Landisville, N. J. The recently completed Landisville plant will produce the company's new line of Bituminous Fiber Pipe and Conduit.

New Technical Data Bulletin On Nickel Alloy Wires

A unique 44-page publication, Price and Technical Data Schedule No. 14, has just been released by **Techalloy Company, Inc.,** Rahns, Pa. For purchasing agents it is an easy-to-use price schedule with simplified pricing. For design engineers it is a technical handbook of wire, rod and strip.

* * *

Price-wise, publication features enlarged versions of "Quik-Chek" Charts which were originated by Techalloy. These schedules have basic prices and all extras listed on one page to save figuring time and to eliminate errors.

Complete technical data is given on chemical, physical and mechanical properties of all Techalloy alloys: Monel, Nickel, Nickel-Clad Copper, Inconel, Inconel "X", Incoloy, Nionel, Ni Span C, Stainless and Heat-Resisting Steels, Electrical Resistance Alloys, Glass Sealing Alloys and Iso-Elastic. Also included are the Federal, Military, ASME and ASTM specifications for these metals.

* * *

Copies of Price Schedule No. 14 can be secured without cost from Techalloy Company.

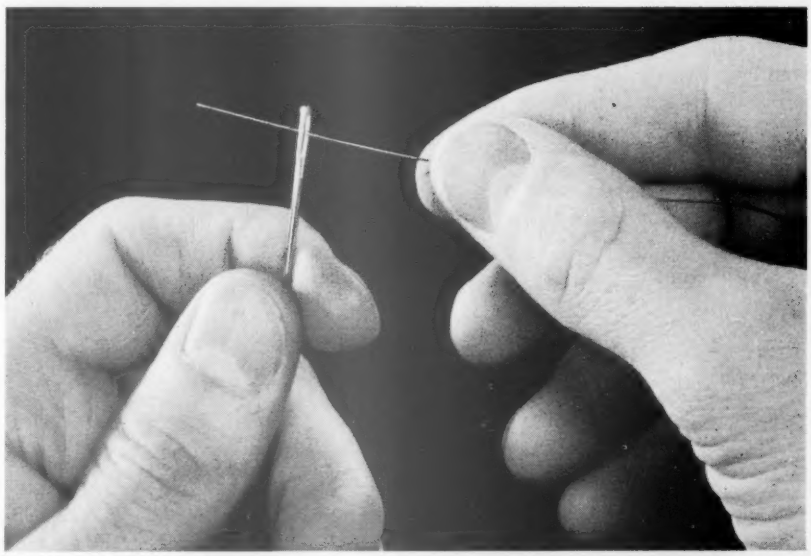
Folder on Bars

The job of selecting the right steel for machine parts for Research and Development is now much easier according to the **La Salle Steel Company,** Hammond, Indiana.

* * *

Ideas for simplifying this problem are contained in a new folder recently developed by La Salle, entitled "Steel Selection for Machine Parts Made Easy for R & D Men."

ALLOY WIRE:
Tailor-made for Specific Purposes



Precision Drawn Strand Annealed Wire

THESE BASIC ADVANTAGES ARE BIG ONES:—

- Closer in tolerances than most commercial wires
- Make important savings in finished products possible
- Tailor-made with special characteristics to meet specific needs

Drawing specialty wire to consistent fine tolerances with specific characteristics of tensile, elasticity, hardness, grain size, etc., demands *exacting control* through all production phases. When applied to specific requirements, these "Specials" also require extensive know-how and advanced production facilities.

As a leading producer of finest quality paper mill wire cloth, woven mesh and cold drawn wire, our production team of metallurgists, engineers and technicians can help you select the right wires for any application and deliver them "on schedule."

WISCONSIN WIRE WORKS
APPLETON · WISCONSIN

This new folder, available on request, explains how Stress-Proof, a high-strength and easy-to-machine all-purpose steel bar, can be readily used for making a wide variety of parts such as shafts, pins, gears, pinions, nuts, etc. No heat treating is required as properties are in-the-bar as received. The material is widely available from Steel Service Centers across the country.

* * *

This folder also suggests in short, easy-to-read paragraphs how the R & D man (or a maintenance man, too) can use this same steel for experimental parts, for prototype models and then on to regular production without a change of specification.

* * *

This helpful folder is available free. Write **W. E. Schneider,** La Salle Steel Company, P. O. Box 6800-A, Chicago 80, Illinois.

Announces New Thermocouple Wire

Amperex Electronic Corp. announces "Thermocoax," a new high temperature thermocouple wire for measuring temperatures from minus-200°C to 1300°C. Thermocoax is eminently suitable for measurements in nuclear reactors and similar high temperature environments. It is available in unprecedented lengths of up to 650 feet, and is so flexible and rugged that it can be hammered, flattened and bent to extremely sharp angles with no short circuiting, loss of insulation, or rupturing of the sheath or inner conductors.

* * *

"Thermocoax" consists of two conductors, one "Chromel" (a chrome-nickel alloy), the other "Alumel" (aluminum-nickel alloy), within a stainless steel or "Inconel" sheath. The conductors are insulated from one another and from the sheath by powdered magnesium oxide, which has been highly compressed during the processing.

* * *

For further information, write: Amperex Electronic Corp., Nuclear Products Division, 230 Duffy Ave., Hicksville, Long Island, N. Y.

Table of Weights For Steel

A handy, easy-to-read table of estimated weights of cold-rolled steel is a feature of a new booklet published by **Caine Steel Company,** Chicago.

* * *

The booklet has been produced as part of the firm's program to provide a new service on round-edge, cold-rolled flat wire and round-edge strip in all thicknesses, widths and tempers for all users, whether large or small.

* * *

The estimated weights table, said **Leon J. Caine,** president of Caine Steel, will be helpful to all purchasers, since it gives approximate weights per lineal foot in pounds for widths from three-eights of an inch to six inches and for thicknesses of .187; .120; .109; .095; .083; .065; and .049 of an inch.

* * *

The booklet can be had by writing Caine Steel Company, 5501 West Grand Ave., Chicago 39, Ill.

ALUMINUM INGOT AND MILL PRODUCTS : MAY 1960

(Shipments and receipts are in thousands of pounds)

Item	Number of companies reporting shipments	May 1960			April 1960* net shipments	May 1959 net shipments
		Gross[1] shipments	Receipts[2]	Net[3] shipments		
ALUMINUM PIG AND INGOT, TOTAL	83	236,531	109,375	127,156	119,023	130,772
ALUMINUM MILL PRODUCTS, TOTAL	164	287,237	15,350	271,887	247,382	321,350
Sheet and plate, non-heat-treatable	28	120,951	10,431	110,520	99,212	126,554
Sheet and plate, heat-treatable	5	16,439	...	16,439	15,475	22,545
Foil, including foil in lamination	15	(D)	(D)	20,364	18,945	21,149
Rolled, and continuous cast rod and bar[4]	5	11,894	2,675	9,219	6,130	14,429
Wire, bare-conductor and nonconductor	16	4,960	1,042	3,918	4,698	6,251
ACSR and aluminum cable, bare	11	(D)	(D)	16,085	15,419	17,664
Wire and cable, insulated or covered	14	(D)	(D)	5,215	3,909	4,617
Extruded shapes, alloys other than 2000 and 7000 series	106	71,816	872	70,944	65,142	83,803
Extruded shapes, alloys in 2000 and 7000 series	8	(D)	(D)	4,089	2,755	4,447
Drawn tube, alloys other than 2000 and 7000 series	11	(D)	(D)	5,769	5,539	8,208
Drawn tube, alloys in 2000 and 7000 series						
Welded tube, non-heat-treatable	5	[5]2,998	...	[5]2,998	3,402	3,379

*Revised.

D Withheld to avoid disclosing figures of individual companies. These figures are included, however, in the appropriate total.

[1]Gross shipments of mill products represent total shipments by producers to customers, including other producers, and shipments by producers to their own fabricating departments which manufacture products beyond the level of mill shapes. Ingot gross shipments include shipments by importers.

[2]For mill products, represents receipts from domestic producers only. In addition to receipts from domestic producers, 535,000 pounds of mill shapes were received through imports. For ingot, receipts from imports are included.

[3]For mill products, derived by subtracting the sum of producer's domestic receipts of each mill shape from the industry's gross shipments of that shape. Ingot data derived by subtracting all receipts from shipments reported.

[4]Includes a small amount of rolled structural shapes.

[5]Includes a small amount of welded tube, heat-treatable.

USCOMM-DC

New Vertical Cleaning Machine

A new vertical conveyor-type washing machine, designed for the inter-process cleaning of small parts washes a 300 to 1500 lb. work load each hour. With its 11 foot vertical conveyor, only 16 square feet of floor space is required. A conventional washer of this capacity requires 44 square feet of floor space.

* * *

A separate conveyor carries the work to the charging hopper. Parts are received a few feet above floor level and are given a thorough spray cleaning as they are conveyed upward to the end of the conveyor where parts are automatically discharged. Parts are discharged at or near ceiling level or the conveyor may be extended to discharge the work on the floor above, thereby eliminating handling costs.

* * *

This Ransohoff unit is complete with conveyor assembly, pump, motors and switches. For further details, write **Ransohoff, Inc.**, No. 5th St. & Hamilton Blvd., Hamilton, Ohio.

Guide to Silicones and Their Uses

An up-to-the-minute summary of the forms, properties and applications of Dow Corning Silicones is contained in this free, 16-page brochure.

* * *

Silicone products reviewed range from adhesives to release agents, laminating resins to rubber compounds, and electrical insulation to water repellents. The index is arranged by applications for quick location of types of silicones for particular uses. Postcards are bound into the guide so that more specific data about a particular product or application may be secured.

* * *

Extensively illustrated with photographs, tables and graphs, this Engineering Guide to silicone products contains valuable data for prospective users. For a copy, write **Dow Corning Corporation**, Midland, Mich. Code: 1-115.

U/L Approved "Teflon" Hook-Up Wire

Availability of a new line of U/L approved appliance wire utilizing standard MIL-W-16878, Type E, Teflon insulation has been announced by **Times Wire & Cable Co.**, a division of The International Silver Company.

* * *

This wire has been rated at 80°C. and 105°C. classifications, with voltage ratings dependent upon application. It is a long awaited solution to commercial design ideas limited by previously approved insulation materials.

* * *

The new hook-up wire is available in 20 AWG through 26 AWG. It offers 10 mil wall thicknesses, high temperature protection, soldering protection, and chemical resistance.

* * *

For additional information contact: Times Wire & Cable Co., Wallingford, Conn.

AMERICAN IRON AND STEEL INSTITUTE
150 EAST FORTY-SECOND STREET, NEW YORK 17, N. Y.

AIS 10

SHIPMENTS OF STEEL PRODUCTS
ALL GRADES INCLUDING CARBON, ALLOY AND STAINLESS
(NET TONS)

JUNE - 1960
Month

Covering Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or for Resale)

STEEL PRODUCTS	Line	CURRENT MONTH 1960 CARBON	ALLOY	STAINLESS	TOTAL	Percent of Total Shipments	Prior Year (1959) Percent of Total Shipments	YEAR TO DATE * 1960 CARBON	ALLOY	STAINLESS	TOTAL	Percent of Total Shipments	Prior Year (1959) Percent of Total Shipments
Ingots and Steel Castings	1A	13,353	10,834	2,114	26,301	0.4	0.4	137,824	61,511	13,219	212,554	0.5	0.4
Blooms, slabs, billets, sheet bars	1B	76,937	25,642	1,786	104,365	1.8	2.0	643,485	242,846	11,029	897,360	2.1	2.0
Tube rounds	1C	687	283	-	970	-	-	8,107	3,010	11	11,128	-	-
Skelp	2	2,921	-	-	2,921	0.1	0.1	79,685	1	-	79,686	0.2	0.1
Wire rods	3	51,170	1,925	533	53,628	0.9	1.5	530,343	16,720	6,066	553,129	1.3	1.5
TOTAL SEMI-FINISHED		145,068	38,684	4,433	188,185	3.2	4.0	1,399,444	324,088	30,325	1,753,857	4.1	4.0
Bars--Hot Rolled (Inc. Light Shapes)	14	370,553	105,407	3,523	479,483	8.1	10.0	3,347,220	934,487	23,647	4,305,354	10.1	10.0
Bars--Reinforcing	15	210,484	-	-	210,484	3.6	3.6	1,037,399	-	-	1,037,399	2.4	2.9
Bars--Cold finished	16	81,942	20,240	3,860	106,042	1.8	2.0	713,080	145,688	29,994	888,762	2.1	2.0
Tool Steel	17	723	6,609	-	7,332	0.1	0.1	6,569	46,680	-	53,249	0.1	0.1
TOTAL BARS AND TOOL STEEL		663,702	132,256	7,383	803,341	13.6	15.7	5,104,268	1,126,855	53,641	6,284,764	14.7	15.0
Wire--Drawn	23	159,596	3,566	1,645	164,807	2.8	4.1	1,306,235	24,411	14,221	1,344,867	3.1	3.8
Wire--Nails & staples	24	26,758	-	-	26,758	0.4	0.6	180,743	-	4	180,747	0.4	0.5
Wire--Barbed & twisted	25	4,364	-	-	4,364	0.1	0.1	27,689	-	-	27,689	0.1	0.1
Wire--Woven wire fence	26	9,813	-	-	9,813	0.2	0.2	68,186	-	-	68,186	0.2	0.2
Wire--Bale ties & baling wire	27	9,113	-	-	9,113	0.1	0.1	37,480	-	-	37,480	0.1	0.1
TOTAL WIRE & WIRE PRODUCTS		209,644	3,566	1,645	214,855	3.6	5.1	1,620,333	24,411	14,225	1,658,969	3.9	4.7
Black plate	28	53,681	-	-	53,681	0.9	0.8	336,243	-	-	336,243	0.8	0.8
Tin & terne plate-hot dipped	29	51,810	-	-	51,810	0.9	0.7	226,276	-	-	226,276	0.5	0.6
Tin plate-Electrolytic	30	548,198	-	-	548,198	9.3	6.9	2,964,818	-	-	2,964,818	6.9	7.3
TOTAL TIN MILL PRODUCTS		653,689	-	-	653,689	11.1	8.4	3,527,337	-	-	3,527,337	8.2	8.7
Sheets--Hot rolled	31	559,947	16,506	2,484	578,937	9.8	11.9	4,763,141	165,607	15,702	4,944,450	11.5	11.4
Sheets--Cold rolled	32	1,302,538	5,349	11,075	1,318,962	22.3	16.6	8,586,493	34,713	79,072	8,700,278	20.3	18.4
Sheets--Galvanized	33	275,974	-	-	275,974	4.7	3.6	1,800,980	356	-	1,801,336	4.2	3.9
Sheets--All other coated	34	21,187	-	-	21,187	0.3	0.3	151,194	-	-	151,194	0.3	0.3
Electrical sheets & strip	35	4,486	40,397	-	44,883	0.8	0.8	28,909	315,333	-	344,242	0.8	0.8
Strip--Hot rolled	36	89,090	1,225	373	90,688	1.5	2.0	787,197	13,622	3,224	804,043	1.9	1.9
Strip--Cold rolled	37	76,681	1,443	12,864	90,988	1.5	1.8	691,208	9,878	101,721	802,807	1.9	1.9
TOTAL SHEETS AND STRIP		2,329,903	64,920	26,796	2,421,619	40.9	37.0	16,809,122	539,509	199,719	17,548,350	40.9	38.6
TOTAL SHIPMENTS (1960)		3,552,302	323,201	45,357	3,920,860	100.0	xxx	39,763,965	2,739,069	330,903	42,853,937	100.0	xxx
TOTAL--PRIOR YEAR (1959)		8,986,492	630,215	83,749	9,700,456	xxx	100.0	44,667,774	3,098,489	390,133	48,156,396	xxx	100.0

* Revised

8260

National-Standard Expanding

National-Standard Company and its foreign subsidiaries are spending approximately $4,500,000 on current projects and others to be completed by next spring to increase manufacturing capacity and improve operations, according to T. H. Pearce, president. Approximately $2,500,000 is being spent in domestic plants for new facilities and equipment.

* * *

National-Standard Company of Canada, Limited, is spending $1,000,000 from its retained earnings and own financing to build and equip a new 40,000 sq. ft. plant in Guelph, Ontario. In England, The National-Standard Company, Limited will spend approximately $500,000 to diversify its operations and add 24,000 sq. ft. of manufacturing area. Up to $500,000 will be spent in other overseas locations, which include National-Standard Company (S.A.) (Pty.), Ltd., Port Elizabeth, South Africa, a subsidiary of the English company, and F & G — Arbed — National-Standard GmbH, Cologne, West Germany, and Cables Mexicanos, S.A., Mexico City, recent affiliates of National-Standard Company.

SKF Navy Handbook Sets U. S. Standards For Defense Products

Delivery of 250 Rolling Bearings Standardization Handbooks by SKF Industries to the Navy in April marked a significant step in standardizing American industrial products for the Armed Forces.

* * *

In addition to establishing standards of comparative performance for all bearing manufacturers' products, the SKF handbook will — for the first time — permit the military to specify bearinfs in all future contracts using a universally accepted rating system.

* * *

The two-volume handbook incorporates the latest industry-wide information covering bearing load capacities, performance, and maintenance techniques and was prepared by SKF under a Navy contract for the Department of Defense standardization program.

Prestressed Concrete 6th Annual Convention

The 6th Annual Convention of the **Prestressed Concrete Institute,** carrying the theme: "Prestressed Concrete, Key to Creative Architecture and Imaginative Engineering," is scheduled for September 27 through September 30, 1960 at the Statler-Hilton Hotel in New York City.

* * *

Registration fee for the convention is $35.00 plus $6.50 for scheduled luncheons. For full details write: **Norman Scott,** Executive Secretary, Prestressed Concrete Institute, 205 West Wacker Drive, Chicago 6, Ill.

Expands Silicone Production

An expansion program aimed at

EXECUTIVE REPORT #7

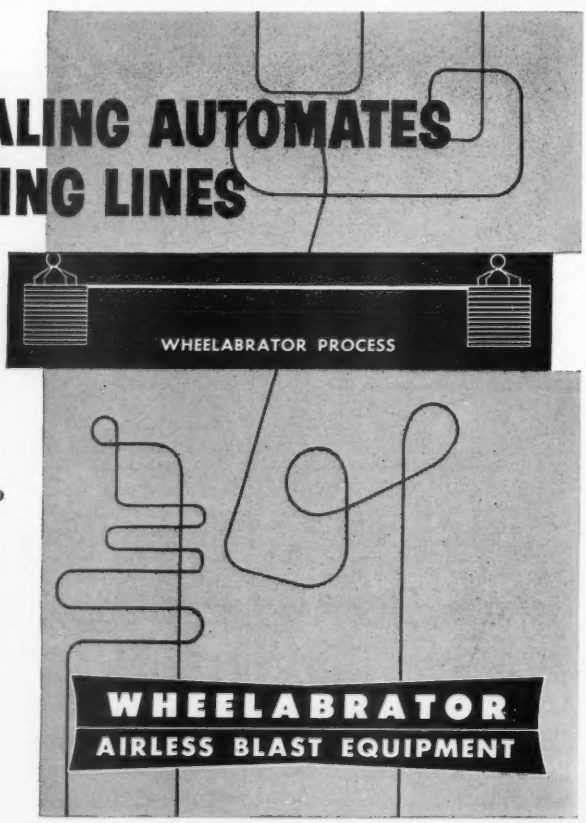
STRAIGHT-LINE DESCALING AUTOMATES WIRE AND BAR DRAWING LINES

Wheelabrator abrasive blast descaling brings new automation to wire products manufacture, with substantial savings in time and labor. Whereas batch pickling requires multiple handling operations, this mechanical descaling process involves handling coils only once or twice.

Rod can be straightened, cleaned, coated, drawn and cold headed in one continuous, straight-line operation. Single or multiple strands can be cleaned at speeds up to 600 fpm. The savings through eliminating acid pickling and multiple handling are enormous.

Take advantage of WHEELABRATOR'S engineering experience in wire descaling

Wheelabrator's unequalled experience in blast descaling of wire is at your service. Send for Bulletin 148-D illustrating the Wheelabrator automated wire drawing method. Wheelabrator Corp., 389 S. Byrkit St., Mishawaka, Ind. Canadian Division: P. O. Box 490, Scarborough, Ont.



boosting production capacity to 1963 demand levels with emphasis on the production of newly-developed products to meet the industry's growing silicone needs is underway in the **Silicone Products Department** of the **General Electric Company.**

* * *

According to **Jerome T. Coe.,** department General Manager, the program will be spread out over the next 24 months and will involve an outlay of several million dollars in new buildings, equipment and processes.

Introduces "Isoloy" As New Trade Name

"Isoloy," a new trade name for its brand of stainless steel spring wire, was announced by **Riverside-Alloy Metal Division,** H. K. Porter Company, Inc., Riverside, N. J.

* * *

Although stainless steel spring wire has been a standard Riverside-Alloy product for many years, the Porter division announced the new trade name to describe the increased uniformity of the product. According to **F. H. Conant,** General Sales Manager, new procedures and equipment added during recent years have assured outstanding uniformity in Riverside-Alloy's stainless steel spring wire.

Collapsible Wire Mesh Boxes

Collapsible wire mesh boxes for use on production lines, for shipping or for warehouse storage, are now available from **Republic Steel Corporation,** Berger Division. The wire boxes, which fold to pallet height for easy storage, are available with capacities of either 2,000 or 4,000 lbs.

* * *

Termed "Loadtainers" by the company, the boxes are fabricated from 2-gage, 70,000 psi minimum tensile strength wire welded into 2″ x 2″ spacing. The sides are helixed to the ends at opposite corners for easy folding, and also to the deck section for extra strength. The deck uses 7/8″ x 1½″ hot rolled steel for the end channels and ¼″ x 1½″ bar stock spaced across the bottom for additional support.

* * *

All boxes have a basic capacity of 2,000 lbs. This may be increased to 4,000 lbs. without adding to the size by welding two vertical reinforcing wires to each corner, and two horizontal wires to each end and side. Heavy-duty, non-slip locks are provided so that sides cannot accidentally open.

* * *

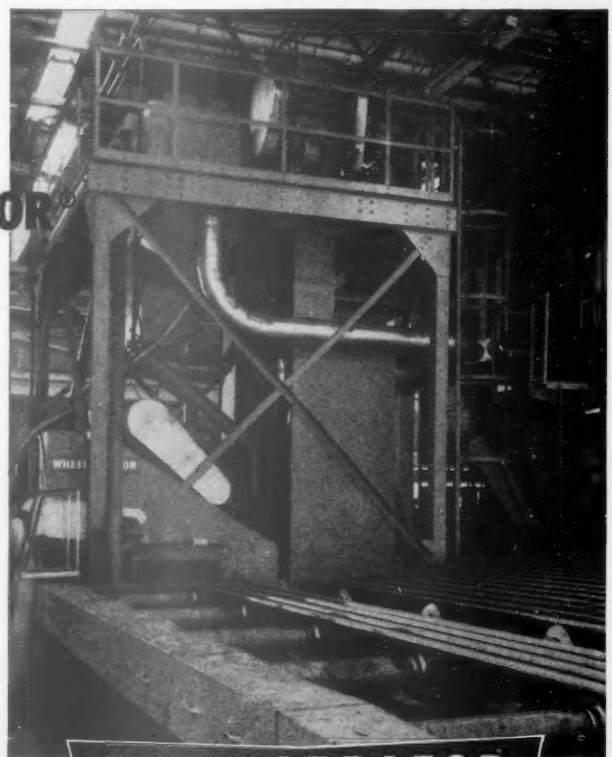
The Atlas Loadtainer has structural corners that resist shock, and the steel legs, welded to each corner of the base frame, are said to be practically indestructible.

Wire Mill Modernization Nears Completion

An extensive modernization of the wire mill at **Riverside Metal Works,** Riverside-Alloy Metal Division, H. K. Porter Company, Inc., will be completed within the next

EXECUTIVE REPORT #30

AUTOMATED DESCALING WITH THE WHEELABRATOR



The bar stock cleaning line in the new two million dollar Elyria, Ohio, Cold Draw plant of The Western Automatic Machine Screw Co., Div. of Standard Screw Co. utilizes one of six Wheelabrator descaling machines that have completely eliminated pickling in this modern plant.
On the bar line, the Wheelabrator enables one man to handle the entire operation, from receipt of bar bundles, through an unscrambler, transfer to feed roll conveyors, through the Wheelabrator, and out onto a storage rack in line with the draw bench. For over 16 months of operation, round, square and hex bar stock, up to 4½″ diameter in 15′ to 45′ lengths, has been descaled without any of the old acid pickling headaches. In addition, Western Automatic reports that Wheelabrator descaling provides a definitely superior product for subsequent cold drawing.

How To Automate Your Bar and Wire Drawing Lines

Details of Wheelabrator's cost-saving descaling method are illustrated in Bulletin 148-D. Write to Wheelabrator Corp., 389 S. Byrkit St., Mishawaka, Indiana. In Canada, P.O. Box 490, Scarborough, Ontario.

WHEELABRATOR
AIRLESS BLAST EQUIPMENT

few months, according to an announcement by **W. H. Thompson,** Vice President and General Manager. The program was designed around the division's continuous casting technique, which assures sound, homogenious metal.

* * *

Modernization of the wire mill at the copper-base alloy plant began in 1958 with the installation of continuous casting equipment exclusive with Riverside-Alloy in the United States. This was the equipment that enabled the Porter division to produce 1000 pound coils containing as much as 10 miles of unwelded phosphor bronze wire. Special spooling and processing equipment followed during 1959.

* * *

Riverside-Alloy's current wire mill modernization program is the second major improvement campaign at the Riverside Works since the plant became part of Porter.

Appoints Texas Representative

Bernard Rodsky, with offices in the First National Building, El Paso, Texas, has recently been appointed to represent **Atlas Mineral Products Company** in Western Texas. The announcement was made by **Joseph A. Snook,** President of Atlas.

* * *

Located in Mertztown, Pa., Atlas is one of the country's leading manufacturers of acid proof construction materials . . . . acid proof cements, protective coatings, tank linings and rigid plastics. Rodsky will handle the entire line of materials.

Big New Catalog Covers Dodge Products

A new general engineering catalog of 468 pages by **Dodge Manufacturing Corporation,** Mishawaka, Indiana, describes all products in its fast growing line of mechanical power transmission equipment.

* * *

This comprehensive book is being presented on a selective basis to key personnel of industrial concerns, mainly through authorized Dodge distributors. Requests should be made on company letterhead.

* * *

Various sections of the catalog are devoted to both new and established product categories, with engineering drawings, dimensions, weights, prices, technical data in tabular form, and many pages of helpful selection and application information. A separate section on general engineering data makes the book a handy reference manual on mechanical power transmission.

Reynolds Conducting Tests On Aluminum Alloys

A vast fund of information about behavior of aluminum alloys is being gathered in a world-wide atmospheric test program begun 14 years ago and now streamlined by use of a unique punch card data system.

* * *

Samples are currently exposed at test stations at Kure Beach, N. C.; Corpus Christi, Tex.; Phoenix,

SEE THE DIFFERENCE YOURSELF...
BETWEEN JUST ANY SPOOL AND
Superior MPS
NO-CREV SPOOLS
No-Crev Spools eliminate the conventional crevice at the inner junction of spool head and barrel. No more production slow-ups due to fine wires getting caught in such a crevice. You can now have continuous trouble-free high speed winding.
We invite your inquiries — let us tell you more about No-Crev Spools. Write us today.
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Ariz.; Richmond, Va.; McCook, Ill.; Manila, Philippine Islands; Dungeness, England; Wildness, England; the Gulf of Mexico; Vasteras, Sweden; and Arenzano, Italy.

* * *

The panels under test are primarily architectural, electrical and structural alloys. Tests take account of weight loss, corrosion rate, strength loss and pit depth, if any. The results will help predict service life and suitability of specific alloys in different environments.

* * *

Until now the tests have centered chiefly on sheet products. But the program calls for increasing emphasis on plate, extrusions and other products.

Broadens Stock of Phosphor Bronze Rod

A wider range of phosphor bronze rod sizes has been made available for immediate shipment by **Riverside-Alloy Metal Division,** H. K. Porter Company, Inc. The ready-for-delivery stock assures rapid delivery. Previously, many rod sizes required several days for finishing prior to shipment.

* * *

The size range includes all standard diameters between 1/8" and 2" in Grades A, B1 and B2 phosphor bronze rod. All of this material meets the specifcations of ASTM B-139.

* * *

Riverside-Alloy noted the stockpile on their current phosphor bronze stock list, which is circulated to distributors and some large users. Additional copies of the stock list have been made available upon request by writing: Stock List Section, Riverside-Alloy Metal Division, H. K. Porter Company, Inc., Riverside, New Jersey.

Thermocouple Wire For High Temperatures

A new refractory metal thermocouple combination for reliable temperature measurement up to 2800°C (5072°F) is now available from **Engelhard Industries, Inc.** The new combination consists of tungsten versus tungsten 26% rhenium and is suitable for use in vacuum, hydrogen or inert gases such as nitrogen, argon and helium. It extends the line of noble metal thermocouple wires already offered by Engelhard and will be supplied by both their Baker Platinum Division and Instruments and Systems Division.

* * *

Further information on tungsten versus tungsten 26% rhenium thermocouple wires may be obtained from the Technical Information Department, Engelhard Industries, Inc., 75 Austin St., Newark 2, N. J.

New Silicone Maintenance Paints

A new bulletin describing high-temperature coatings for maintenance painting and industrial finishing has been made available by the **Dampney Company** of Boston, Massachusetts.

GREATER FLEXIBILITY IN WIRE STRAIGHTENING AND CUTTING WITH VARIABLE SPEED DRIVE

. . . in a low cost machine

- Select-O-Speed Drive permits selection of infinitely variable feed speeds from 25 to 155 FPM for all types of wire and rod.
- Available with super-sensitive electric trip mechanism.
- High-Speed Five-Die Straightener Arbor, mounted on ball bearings.
- Lewis engineered, simple, rigid, dependable . . . of best materials and workmanship.
- Ideal for manufacturers of stove and refrigerator racks, lamp shades, wire baskets, garment hangers, welding rod and other products where small diameter wire is used.

Lewis 1-C Automatic Wire Straightening and Cutting Machine. 1/16" to 1/8" capacity.

For further information write:

THE LEWIS MACHINE COMPANY

3441 EAST 76TH STREET • CLEVELAND 27, OHIO

The bulletin provides complete descriptive information on Dampney silicone and silicone-ceramic coatings and their use as a protection for metal exposed to heat, wet or dry to 1400°F, corrosive atmospheres and weather.

* * *

Silicone formulations described in the publication were developed by the Dampney Company with the technical assistance of the General Electric Company and take advantage of the latest G-E technology in silicone resins. These are either developed by Dampney or produced to meet individual manufacturer's or government specifications in colors conforming with Federal Standard No. 595.

* * *

Copies of the new publication may be obtained by writing to the Dampney Company, Hyde Park, Boston 36, Mass.

Wire Fan Guards

Ranging in size from 73 inches to 2½ inches in diameter, welded wire fan guards protect personnel from whirling blades in such diverse applications as air conditioning blowers and electronic cooling equipment. Made of concentric rings or spirals, the guards are electric resistance welded for maximum strength.

* * *

Wire fan guards are light in weight, and their open construction allows free flow of air. Many attractive finishes are available, such as Lustre-Zinc, Colored Lustre-Zinc, cadmium, nickel, chrome, and brass, for use in a wide range of applications. Designed and manufactured by **E. H. Titchener & Co.,** 57 Clinton St., Binghamton, N. Y.

The Welding and Brazing of Certain Cobalt-Containing Alloys

The Cobalt Information Center's June quarterly, **Cobalt,** will review the processes and techniques for welding and brazing some cobalt-containing alloys.

* * *

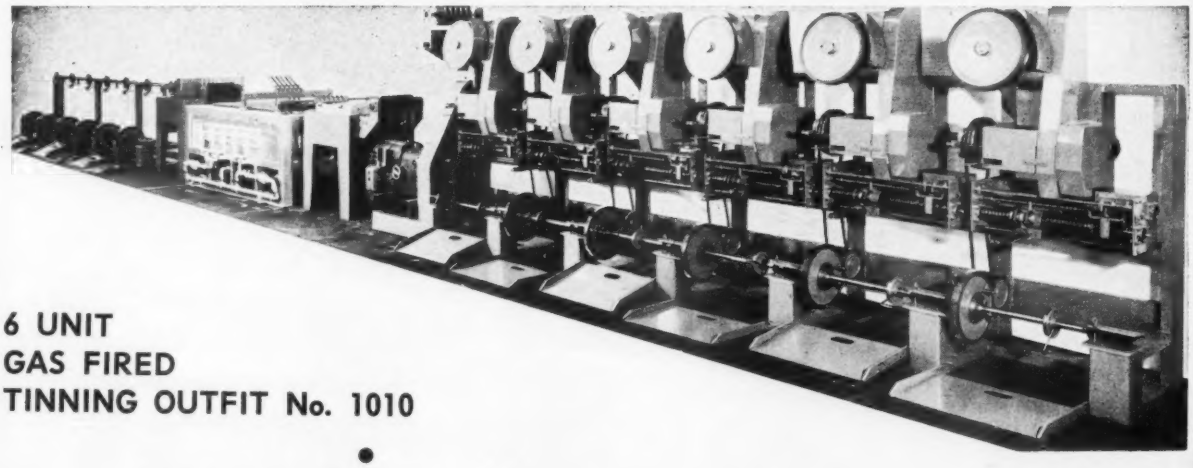
As corrosion- and heat-resistant materials, the cobalt alloys resemble certain austenitic types of stainless steels; processes and techniques applicable to the welding of the latter can, with modifications, be used on the former. The cobalt-containing alloys considered (iron-, nickel-, and cobalt base) include: G.18B, Multimet N-155, S-590, Kovar A, Rodar, Therlo, Refractaloy 26, Rene 41, Nimonic 90, M-252, Udimet 500, 600, 700, Inconel 700, Waspaloy, HS-21, HS-25, HS-31, G.34, Refractaloy 70, Refractaloy 80, S-816, J-1570, Cobenium, and Elgiloy.

* * *

This technical-instruction article will be available as reprints from the Cobalt Information Center, c/o **Battelle Memorial Institute,** 505 King Avenue, Columbus 1, Ohio. Foreign inquiries should be addressed to Centre d'Information du Cobalt, 35, rue des Colonies, Brussels, Belgium.

New Armature Banding Wire

A new tin coated stainless steel



6 UNIT
GAS FIRED
TINNING OUTFIT No. 1010

•

Send for information on the following:

WIRE ANNEALING, TINNING and GALVANIZING OUTFITS
MULTIPLE or SINGLE UNIT WIRE TAKE-UPS
FINE WIRE DRAWING MACHINES
MAGNET WIRE ENAMELING EQUIPMENT, INCLUDING
PRE-ANNEALERS, SYNTHETIC ENAMEL APPLICATORS and CIRCULATING SYSTEMS
COTTON, GLASS-FIBRE and TAPE COVERING MACHINES

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"American" AIMCO INSULATING MACHINERY COMPANY
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FAIRHILL AND HUNTINGDON STREETS
PHILADELPHIA 33 PENNSYLVANIA U.S.A.

Six *advantages from just* One *dip!*

and ONE DIP *is all that is necessary for coating wire and steel rods . . .*

good acid neutralizing

faster butt welding

better working conditions

longer storage with safety

rust inhibitor coating

longer die life

you get them all with . . .

BORAX 5 MOL.

BORAX 5 MOL offers worthwhile advantages over regular borax as a satisfactory coating material on ferrous rods and wire in preparation for dry drawing. This newer material offers a higher concentration of sodium borate and therefore savings may be realized through reduced transportation, handling, and storage costs. Only about three-fourths as much Borax 5 Mol need be used to equal regular borax . . . yet you get the same worthwhile results!

Write to our Technical Department for further information

U.S. BORAX

50 Rockefeller Plaza, New York 20, N. Y.
630 Shatto Place, Los Angeles 5, Calif.

wire, offering superior soldering characteristics when used for banding electric motor armatures, is in production by **Riverside-Alloy Metal Division,** H. K. Porter Company, Inc. The outstanding uniformity of the tin coating assures a problem-free soldering operation.

* * *

Using a special analysis of Almet 302 Stainless Steel and a custom built tinning line, Riverside-Alloy has produced production quantities of the new armature banding wire. Tests show an even coating of tin over the entire surface of the new wire, which is essential because the finished wire must be soldered after being wound around the armature. This banding wire can be supplied in any diameter from .031″ to .105″. It has been packaged on 75 and 100 pound reels.

U. S. I. Publishes Booklet On Polyethylene Bulk Handling

A 24-page booklet on the advantages of bulk purchasing and handling of polyethylene resins has been published by **U. S. Industrial Chemicals Co.** The booklet analyzes in detail, with the help of photographs, diagrams, charts and tables, the factors to be considered in bulk ordering and handling of these materials, with particular reference to U. S. I.'s Petrothene* polyethylene resins.

* * *

The principal advantages of bulk purchasing of polyethylene, aside from the price allowances granted to bulk buyers, are lower handling costs and warehousing expenses, more efficient processing of resin, and reduced hazards of resin losses and contamination, the booklet points out.

* * *

A comparison is made of the two most commonly used methods of polyethylene bulk purchasing, the Dry-Flo® railroad car and the Sealdbin® rubber container.

* * *

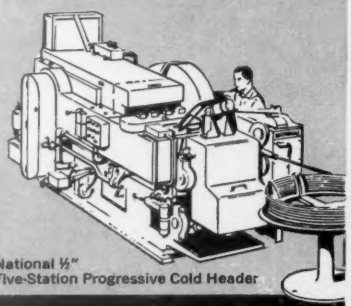
Copies of the booklet may be obtained by writing to: Technical Literature Dept., U. S. Industrial Chemicals Co., 99 Park Ave., New York 16, N. Y.

* **Registered Trademark of National Distillers and Chemical Corp.**

These important parts are cold-formed from wire, start to finish in compact, efficient National Cold Headers.

Practically scrapless, all these parts achieve remarkable savings over past methods.

If you make odd-shaped parts, may we help you evaluate them for cold-forming from wire? Better yet, come to Tiffin, witness our demonstrations and let's discuss your work.



National ½" Five-Station Progressive Cold Header

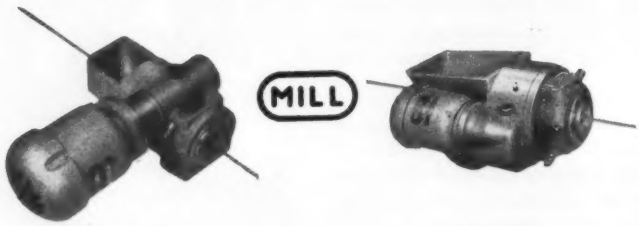
NATIONAL MACHINERY CO.

TIFFIN, OHIO, U.S.A.

HARTFORD DETROIT CHICAGO

ROTATING DIE-HOLDER

for a perfectly round wire and improved die life



Type FR43
for max. outside dia. of die 1 11/16"

Type FR53
for max. outside dia. of die 3 5/32"

SOCIETA GENERALE DELLE MACCHINE MILL
Via Monti, 9 - MILANO - Italia

WIRE DRAWING MACHINES AND FIXTURES

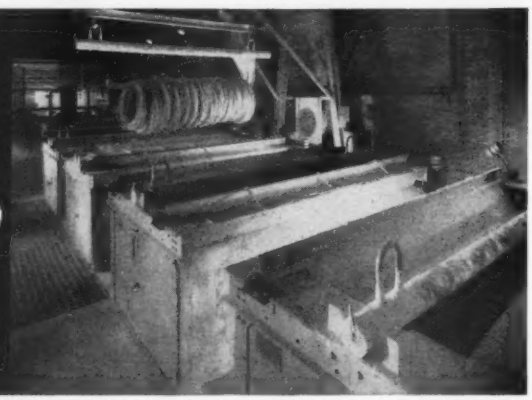
General Catalogue on application

Belgium: R. Dahinden S. A., rue A. Dansaert 123, Bruxelles 1.
France: Soc. Bewe, 66, rue Saint-Sabin, Paris 11
Great Britain: Stanton Machine Tools Ltd., West Molesey, Surrey.
Japan: Asia Industry, Saiwai Bdg, Uchisaiwacho, Chiyodaku, Tokyo.
South Africa: Atlanta Ltd., P.O. Box 8347, Johannesburg
Spain: Semill, apartado 419, San Sebastian.
Sweden: S. Bergstrom & Co., Post Box 47039, Goteborg, 47.
U. S. A.: Standard Industrial Compounds Co., Frankfort, Illinois.

other countries representatives are needed

carl mayer

HI-SPEED REGISTERED ROD BAKERS



Faster baking, greater fuel economy, maximum production efficiency are just a few of the results of the exclusive heating arrangement of the Carl Mayer Hi-Speed Rod Baker. It also has a patented blow-off feature which removes moisture without damage to coils.

Here are just a few of our many satisfied customers:

American Steel & Wire Co.
Atlas Steel Co.
Colorado Fuel & Iron Corp.
Crucible Steel Co. of America
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B. Greening Wire Co., Ltd.
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Republic Steel Corp.
Sheffield Steel Div. Armco Steel Corp.
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Write for Bulletin No. 350

Patent Nos.
U. S. A. 2,296,361
2,323,828
2,235,559
Canada 396,144
401,589

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OTHER PRODUCTS: Core Ovens • Mold Ovens • Welding Rod Ovens • Heat Treating Ovens & Furnaces • Special Processing Equipment and Accessories.

Wire Testing by Ultrasonics

(*Continued from page* 1133)

leased. The signal can be optical or acoustic or be registered on a recording apparatus. Finally, by means of a mechanical construction actuated by this signal, the defective place on the wire can be automatically marked.

* * *

The working speed of testing, of 1 m/sec (200 ft./min.) was attained with the equipment used, and permits the testing also with extraordinarily high demands on the identification of defects. Greater testing speed places greater demands upon the testing equipment, which will doubtless be satisfied. In wire of a few tenths of a millimeter in diameter, the very smallest cracks, lengthwise or transverse, with a depth of only 10% of the diameter are plainly shown; in heavier wire, such cracks with depths of 0.1 to 0.2 mm. Not only higher speed but still greater sensitivity appear to be attainable, giving promise of a very accurate apparatus for wire testing. For no such vibrations of low frequency can originate at the point of sound coupling that the wetting of the wire with the coupling water could affect. As the acoustic sensibility of the Echomat is around 1/50 of a second and the inspection range of the Echomat about 20 cm. (nearly 8 inches) of wire length, theoretically a testing speed of 10 m/sec. (1968 ft./min.) is easily conceivable; but with so great a velocity the necessary coupling between water and wire will come into question.

* * *

The investigations up to now took place, by preference, on such special wire as is needed in the electrical industry, therefore on tungsten wire, Dumet wire for sealing in, on silver solder wire as well as different kinds of wire of high-grade alloys, and also on common copper and steel wire. Wire segments of brittle material, which sustain no bending, for example fine cemented tungsten filaments, can also be tested by the

same apparatus, where they are simply placed in a horizontal position over the sound-head container. Numerous control experiments by photomicrographs on tested wire and bars have proved that the record of defects so measured agrees exactly with the actual distribution of defects of whatever kind along the wire.

* * *

Likewise such wire was tested as might contain fine piping or slag. In this kind also, defects lying inside the wire were correctly and exactly shown; which should be especially understood, in order to set aright any future assumption that the test is only of the wire surface. Such surface waves are, in isolated instances, emitted in the case of thick bars by a particular angle of transmission; also it is contemplated to extend the described method to testing of bright drawn rounds, exclusive of surface cracks, as it might happen in some cases that only detrimental surface cracks are detected. On this account it is meaningful to suggest, instead of the wire wave here discussed, the using of genuine surface waves which, by suitable setting of the radiation angle, follow an extended spiral about the bar, which is moved lengthwise for testing. However that is possible only with thicker bars from about 10 mm diameter.

Summary

The new testing method here described permits hitherto unsolvable problems to be successfully carried out by ultrasonic testing. The method is simple, practical, and so sensitive that it meets the most severe requirements. The present limit of testing speed is set not by the method but only by the stability of the mechanical equipment. There is hope that the testing speed of 1 m/sec. (197 ft./min.) may be increased 5 to 10 times. The cost of apparatus is relatively small, so that the economy of the method is assured.

FOR WIRE ROD THAT'S REALLY FINE--

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Niederrhein, Europe's largest wire rod facility with its completely modern installations assures close tolerances for diameter and out-of-round, excellent surface and light scale.

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inside diameters 20, 24, 26, 33½"
Compressed bundles of 3000 lbs now available on request.
Reliable delivery schedules at a fair price.

DOUBLE TWIST QUADDING MACHINE

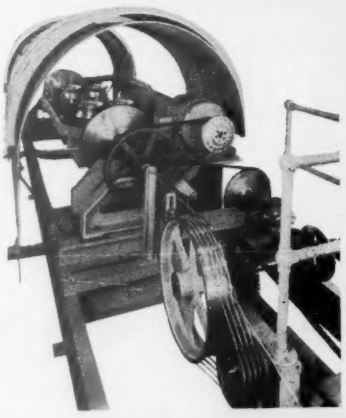
The photo shows our High Speed Light Duty Double Twist Quadding Machine viewed from the out put end.

In this construction all four reels are placed in the cradle. Each reel is mounted on an independent mandrel, rotating freely on anti-friction bearings and fitted with our patented Constant Tension and Over-Run Prevention Device.

Reel sizes vary up to 24 inches in diameter and 12 inches over all width.

Production from 1000 to 1400 twists per minute, depending upon reel size.

In size this machine is slightly wider and larger than our Standard Two Wire 30" Frame Twister.



DOUBLE TWIST QUADDER

This is a very efficient machine for the plain twisting of two, three or four wires.

For further information write to:

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Makes handling and storing of unwieldy wire coils a simple one-man operation. Improves plant housekeeping, saves space, provides positive inventory control. Front and side fork entry permits closer stacking and greater maneuverability in narrow aisles. Saves time, labor, cuts costs. Standard and special sizes.

New Line of Extruders Announced

A new line of 3½, 4½ and 6 in. thermoplastic extruders, with unique space-saving design, versatile modular construction, greater thrust and horsepower capacity and optional liquid cooling, is announced by **National Rubber Machinery Company.**

* * *

Designated the Pacemaker Series because of its advanced design and pace-setting features. NRM's new extruder line has its drive motor and speed control under the extruder barrel to conserve valuable plant floor space. According to the manufacturer, production increases up to 350% can be realized by installing a 4½ in. Pacemaker in the same floor space presently occupied by a 2½ in. extruder with in-line drive.

* * *

Basic design of the Series permits selection of the drive gear ratio, thrust bearing capacity, drive horsepower, screw type and heating-cooling combination exactly matched to the extrusion requirements of a particular material. Extra-capacity drive and thrust components can be installed without time-consuming rework of the basic unit.

* * *

These new extruders are offered in 3½, 4½ and 6 in. sizes, with L/D ratios of 20:1 or 24:1, vented or non-vented, with induction or resistance heating and Temp-Flo liquid or balanced air cooling.

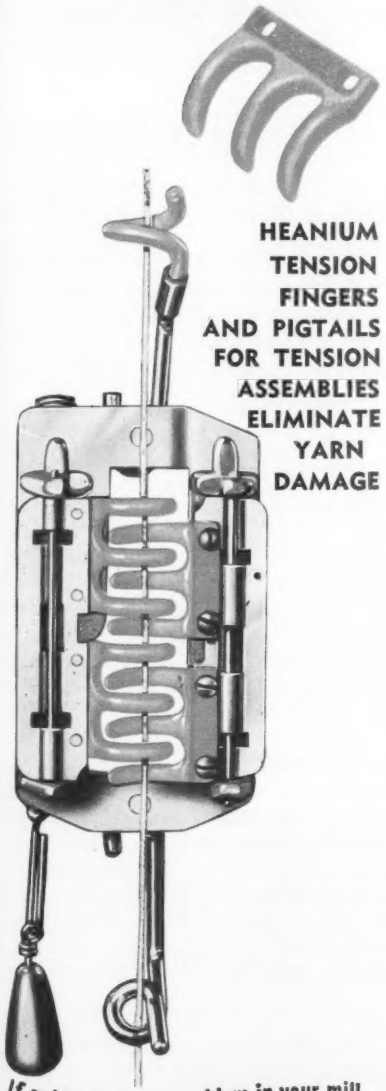
* * *

For full information, write National Rubber Machinery Company, 47 W. Exchange St., Akron 8, Ohio. Ask for Bulletin PM-100.

Sunbeam Appoints Manufacturing Representative

Sunbeam Equipment Corporation, Meadville, Pa. has appointed **Matheson-Doherty Company,** 225 Shaw Road, South San Francisco, Calif., to represent the Sunbeam line of industrial furnaces and equipment in the northern half of the state of California.

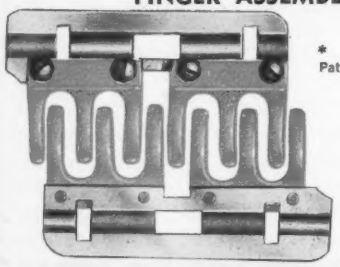
"YOUR GUIDE TO LOWER COSTS"



HEANIUM TENSION FINGERS AND PIGTAILS FOR TENSION ASSEMBLIES ELIMINATE YARN DAMAGE

If guide wear is a problem in your mill . .

try HEANIUM T-3-F FINGER ASSEMBLIES*



* Patented

HEANY INDUSTRIAL CERAMIC CO.

Precision Cable Manufacture Improved With New Type Reels

(*Continued from page* 1127)

performed as well as the tested samples, 500 more reels were ordered. Still later, when the company desired greater capacity, another 500 reels with flanges 24 inches in diameter were ordered.

* * *

Toteline molded fiber glass reels weighed only one-third as much as steel reels, could be lifted easily without special handling equipment and required no maintenance whatever.There were no nuts and bolts to be tightened, no dents to remove and no straightening. There were no products of corrosion to discolor insulation or other wire coverings.

* * *

The company's supervisor of scheduling said: "We've made a substantial saving since we began using Toteline reels. I'm satisfied that as far as flanges are concerned, there is no reason why a molded fiber glass reel would ever have to be discarded. Periodic inspection of the drums has not turned up a single case to date where the drum has started to separate from the flange.

* * *

"This separation is a constant source of trouble with steel reels. Once an opening develops, wire tends to lodge in the cracks. The result is pile-ups, uneven traversing and wire breakage.

* * *

"Our molded fiber glass reels take a lot of abuse. Heavily loaded reels are rolled over floors. They are revolved at high speeds. But these reels are in as good shape as they ever were. That makes it difficult to determine how much longer than steel their service life is going to be, but we're satisfied it will be much greater. Also, since their performance has been trouble-free, we can't determine how many production interruptions we've avoided by using them.

* * *

"There's no question that molded fiber glass reels are helping us make faster deliveries of better products while

For Real Economy Use

Wire Dies For

Stranding
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HEANIUM® DIES — economical when used for applying heavy coat OF TIN TO WIRE. Tin does not adhere to polished Heanium®. Can be used in place of more costly materials for heavy tinning, offering great saving. HEAT OR ACID HAS NO AFFECT ON HEANIUM®. Available mounted or unmounted, rough cored or finished to size. Easily recut on standard die equipment in a fraction of the time required by other materials.

Physical properties:
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TWISTING • STRANDING • BUNCHING
Continuous Tension Control
For Precision-Quality

HASKELL-DAWES
MACHINE CO., INC.
2231 E. Ontario Street
Philadelphia 34, Pa.

holding production costs down."

* * *

Difficulties with corrosion have been completely eliminated. It is not necessary to cover the drums of molded fiber glass reels with tape to prevent rust marks on wire or to fit cardboard inserts on each flange to keep the wire clean.

* * *

In one test of wire and cable, reels of insulated wire or cable are submerged in a large tank of water and given a high voltage test. Careful measurement of insulation resistance is recorded. Reels of molded fiber glass undergo this submersion in water repeatedly without being affected, whereas steel reels deteriorate quickly.

* * *

The company said absence of nuts and bolts on molded fiber glass reels provides still another advantage. On cabling machines, for example, nuts tend to loosen, allowing the bolts to protrude far enough to hit the cradles holding the reels. Wire breakage is the usual result, followed by down-time on the machines and lost production.

* * *

Dimensions were found to be more stable on the molded fiber glass reels, especially on width where consistency is important to proper traversing. At the start of a production run, traversing is set up for a certain width. Variations in width of drums require new setups to maintain proper traversing.

* * *

In addition to use on cabling machines, this plant uses molded fiber glass reels to let wire off and take it up again after such operations as insulating wire, giving wires a painted stripe for color identification, spark and other testing, lacquering and painting.

* * *

The new type reel was developed in our laboratories after considerable experience in making all kinds of materials handling products. The combination of fiber glass and polyester resins is molded on steam heated matched metal dies in hydraulic presses which supply the necessary pres-

sure. The resulting material is a hard, infusible solid with a greater strength than steel on a pound-for-pound ratio. The material is inert, rust-proof, corrosion-resistant and will not warp, rot, bend or dent. Tests indicate a life expectancy of at least 20 years for reels under the hardest kind of service.

Hydraulic Cut-Off and Upset Testing Machine Increases Efficiency in Quality Control

(*Continued from page* 1139)

This steel mill estimates that the units paid for themselves within three months due to the tremendous savings in costs all along the line.

* * *

The units also have proven valuable in the fastener industry where each raw piece of steel or rod must be tested before it is fed into the bolt cold heading machines. Their use has resulted in a sharp decrease in the costs of cutting and testing the samples. It has also reduced costs by being able to check immediately the quality of the steel before it enters the cold headers, thus saving the time, material and labor wasted in the processing of defective rod or wire that would result in rejected fasteners.

* * *

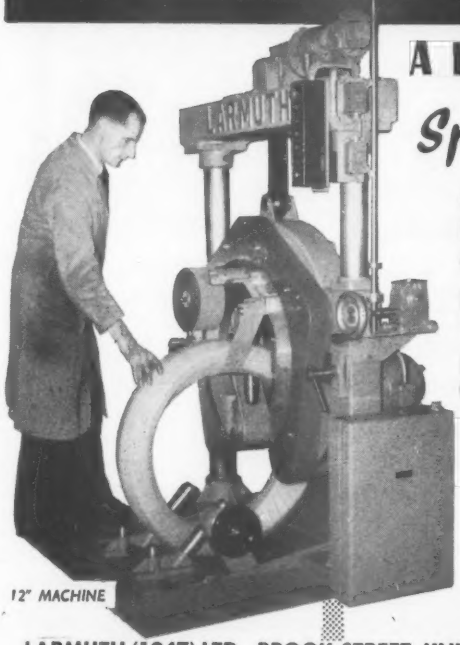
The units can be set up right at the end of rolling mill rod conveyor, or be supplied with wheels so that they can be portable and moved to different locations when so desired.

* * *

Our company is finding an increasing trend among wire and wire product mills to make use of these hydraulic cut-off and upset testing machines to increase efficiency in quality control and to reduce the time often wasted in processing, handling and shipping items that may be defective and shipped before the defects are noted.

HEAVY COIL WRAPPING MADE EASY WITH LARMUTH'S NEW 12" MACHINE

Now Glues The Paper As It Wraps



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FOR COILS UP TO 12" WIDE

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all the wire industry in the West looks to 2 companies

First, there's Western Wire & Textile Machinery, Inc., the only company in the West that deals exclusively in used and reconditioned wire and cable-making equipment.

Secondly, there's the Paul I. Kenner Co., supplier and distributor of new wire and cable manufacturing machinery and supplies.

Nowhere else in the West will you have a better chance of finding exactly what you need---either new or used. Nowhere else in the West will you be able to trade in old equipment on new. Nowhere in the West will you find such a complete stock of machinery and equipment.

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2 Two companies that provide all that's needed, new and used for the West's wire industry.

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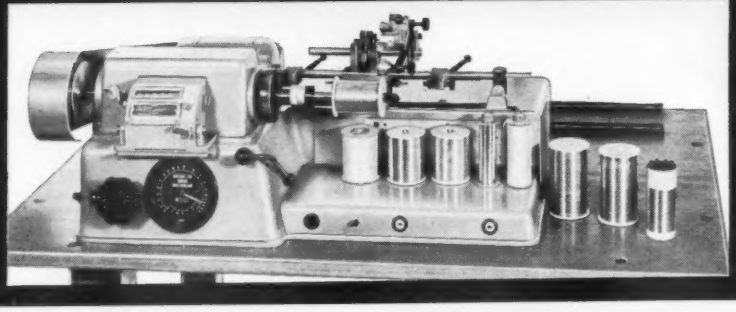
New HIGH SPEED WINDER for BRAIDER BOBBINS



The ME-301 hi-speed winder for braider bobbins has a winding speed up to 6000 RPM, 3600 ft/min. The electrical "No-Dwell" traverse gives perfect spooling; guarantees trouble free running on braiders.

Included is take-off equipment that gives precise identical tension control with automatic stops; time saving clamping and cutting device available.

Excellent winding of copper, aluminum, stainless steel, glass, dacron, cotton, fibreglass and other materials.

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- Perfect thread layer winding of "impossible"wire.
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MANY OTHER ITEMS

WIRE & TEXTILE MACHINERY INC.
P. O. BOX 436, PAWTUCKET, R. I.

Design for Cold Heading

(*Continued from page* 1120)

avoid the possibility of premature failure.

c. Cupping (or Dimpling)

Cupping, sometimes called dimpling, refers to punching a conical indentation into the end of a shank, usually to facilitate the peen riveting of the end.

d. Ribs

Ribs are small edges of stock on the shank, extending downward from the head. They may be required for tight driving and if made in the heading process will be cheaper than a secondary knurling operation.

e. Identification

Many parts are given identification marks in the heading operation by embossing or impressing one or more letters, numbers, or other marks in the top of the head to indicate the manufacturer, part number, material, etc.

f. Slotting

In many cases it is possible to form a slot in the head in the heading operation.

g. Trimming

Heads may be trimmed to other-than-round shapes in the cold heading operation by a trimming punch.

h. Other-than-round wire stock

Parts may be made from other-than-round wire stock — square, half-round, etc. — to prevent turning, fit mating parts, and meet other special requirements.

i. Specifications

All drawings should be clear, complete and legible and include as many properly dimensioned views as are required to show every detail of the part. It should never be necessary to calculate, scale, assume, or guess any dimension, tolerance or other feature important enough to require control in manufacture. Whenever possible, each part should be detailed on

a separate sheet and each should be properly identified with a number and date, and each subsequent revision dated.

* * *

Specifications need not be long and it is advisable to incorporate them into the drawing. They should include the material designation and reference to any particular end properties required, tests which must be passed, treatments desired, etc.

j. Design suggestion for cold heading

1. **Design for the smallest diameter stock that will meet requirements.**
2. **Limit the amount of metal to be upset to the minimum that will meet requirements.**
3. **Specify round heads whenever possible.**
4. **Specify heads or other upset portions of the minimum diameter which is consistent with requirements.**
5. **Specify carbon steel of cold heading grade unless specific requirements necessitate another type of material or unless it is certain that some other material will prove lower in cost or justify such higher cost as may be involved.**
6. **Do not specify inside corner or sharp junction between upset and shank if a small radius will meet the requirements.**
7. **When a shank requires a stepped diameter, provide for taper at the step unless the extra cost for machining a square step is warranted.**
8. **Do not specify narrower dimensional limits than are essential or than are to be held in mating parts.**

Redesigned Wound Rotor Motors

The Louis Allis Co. has announced the availability of a new line of completely redesigned Wound Rotor Motors to meet NEMA Standards in frame sizes 213 to 326 U.

* * *

The new design features substantial reductions in both size and weight while retaining durable cast iron housing and end bracket construction with oversize grease reservoirs for maximum protection against shock, corrosion and insuring minimum maintenance.

* * *

Important features include: improved secondary characteristics to reduce control and installation costs; low rotor inertia design for greater response; rugged collector and brush assemblies to add reliability; plus an advance Class B insulation system for greater protection against moisture, oil, dirt, weak acids and abrasive dust.

* * *

For additional information, write Advertising Department, The Louis Allis Co., 427 E. Stewart St., Milwalkee 1, Wis., or telephone HUmbolt 1-6000.

Timing Drive Selection Bulletin

Wood's 8-page Bulletin 21103, "5 Simple Steps to the Selection of Timing Belt Drives," gives a method involving a minimum of mathematics for the selection of a drive to fit any application. The bulletin includes five sets of curves for drive-width selection, developed by Wood's engineering department to eliminate tedious computation.

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- BRAIDERS
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PRECISION WOUND ON WARDWELL TUBES AND NEW ENGLAND BUTT TUBES
WRAPPING AND SERVING YARNS
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MOLDED WIRE BRAIDER SPOOLS
SMOOTH SPOOL HEADS will not break, warp, knick or rough-up—reducing maintenance costs. The instant locking feature saves time locating "dog-hole". Lighter than metal spools with less wear on Braider and Winder.
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A standard timing belt catalog is the only outside reference needed.

* * *

For a copy of the bulletin, please write to **T. B. Wood's Sons Co.** Chambersburg, Pa.

Narragansett Wire To Install Rod Mill

Baldwin-Lima-Hamilton's Industrial Equipment Division, Philadelphia, has received an order for a semi-continuous Loewy wire rod mill from the **Narragansett Wire Company,** Pawtucket, R. I.

The installation will consist of one 3-high roughing mill, two 2-high intermediate mills, four 2-high continuous finishing mills and complete auxiliary equipment.

8000 Hanger Clips Per Hour Made and Packaged Automatically on Verti-Slide, Turret System

Automatic forming and packaging of wire hanger clips at an unusually high rate has been accomplished at **Cuyahoga Products Corporation,** Cleveland, Ohio, by combining a Torrington UB3 Verti-Slide vertical four-slide machine and a simple indexing box turret. Eight thousand clips per hour are being produced from .0475-in. coppered steel in the open forming area of the vertical machine (center in photo), dropped down a guide rod and through a tube, and then into paper boxes spaced around the edge of the table (bottom, center). As each box is filled to its capacity of 1000 clips, the turret table is indexed counterclockwise to bring the next of twelve boxes in position under the tube. With Cuyahoga's entire output of the proprietary Clamco "slip-on" hanger clips assigned to the single UB3 machine, the only human attention required in producing them is replacement of the boxes every few hours and installation of a fresh coil of wire several times a day.

* * *

The recently introduced UB3 Verti-Slide vertical four-slide machine, made by **The Torrington Manufacturing Company,** Torrington, Conn., is particularly adaptable to automated production because of the greater accessibility and increased height of the wire line and forming area. While this vertical type of four-slide machine was designed particularly to achieve high-speed production of precision wire forms at low tooling costs, location of the forming area at 48″ off the floor permits the parts to be conventiently dropped and transferred to subsequent operations.

Catalog of Shaped Wire

Page Shaped Wire Catalog DH-1226-A, a new edition is available from **Page Steel & Wire Division,** American Chain & Cable Company, Inc., Monessen, Pa. This 16-page catalog covers Page's facilities for providing wire of various analyses preshaped to a desired cross-section as a means to help the user reduce his production costs and improve the design of his product. It also contains helpful information on methods of calculating areas of common shapes; physical properties of steel wire; table of standard wire gauges; and hardness conversion tables.

WIRE DRAWING MACHINERY
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Armco Licenses Republic On Stainless Steels

Logan T. Johnston, President of **Armco Steel Corporation** has announced that Armco has granted a license to **Republic Steel Corporation** to produce and sell the precipitation-hardenable stainless steels developed and patented by Armco.

* * *

Republic also has been granted the right to use Armco's trademarks 17-7 PH, 17-4 PH, and PH 15-7 Mo with reference to the licensed products.

* * *

The 17-7 PH and PH 15-7 Mo precipitation-hardenable stainless steels are used extensively in air defense weapon systems, particularly in supersonic jet aircraft, because of their superior strength-to-weight ratios at the elevated temperatures developed during supersonic flight.

* * *

In commercial applications, the 17-4 PH alloy is used in bar and wire forms in a far ranging variety of products such as boat and pump shafting, stud bolts, valve stems, surgical instruments, high pressure cylinders, and many other forged or machined parts that require both the high strength and the corrosion resistance of stainless steel.

* * *

Heat-treated and machined 17-4 PH parts have four times the yield strength of parts made from free-machining 18-8 stainless steel. This very high strength is an advantage in such application as stud bolts and shafting.

New Packaging Method Effects Savings On Wire & Cable Wrapping

Dramatic packaging progress has resulted from the development of the new UW-16 Spiral Wrap Machine, designed by **Ludlow Papers,** Framingham, Mass.

* * *

Goodall Rubber Co., Trenton, N. J., manufacturers of plastic hose, investigated and purchased a UW-16 spiral wrapper to wrap gigantic coils of hose. Widths of coils go up to 15 inches and outside diameters to 82". Formerly, the forming of corrugated sheets into cartons was a time consuming and costly operation and an unsatisfactory package resulted.

* * *

The largest and smallest coils are easily, economically and satisfactorily wrapped. Costs per coil: ½" hose used to cost $2.65, spiralwrap method .63 — savings of $2.02 per coil; 1¼" hose used to cost $3.70, now with the spiralwrap method .86 — a savings of $2.84.

* * *

Ludlow's UW-16 Spiral Wrap Machine with its 16" shuttle gap is equipped with the most modern electrical controls for ease of operation and package uniformity and is constructed to handle plastic pipe, wire and cable up to the width and capacity of the machine. The wrapping paper is a waterproof laminated reinforced creped

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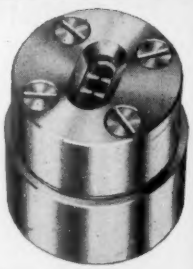
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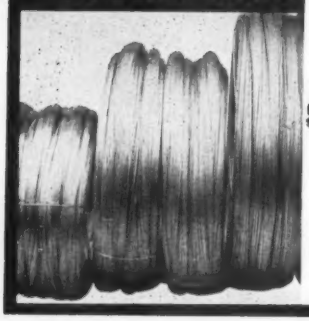
paper manufactured by Ludlow Papers, who provide a complete engineering service on their machines and paper.

"Polyethylene Wire and Cable Insulating and Jacketing Compounds"

Designed to assist fabricators in the selection of the most suitable material for a specific use, this publication contains extensive data on each available Bakelite polyethylene for wire and cable. These data include detailed physical and electrical properties; listings of Bakelite polyethylene resins and compounds for wire and cable covered by ASTM Specification D1248-58T and Federal Specification L-P-590; and those materials covered by various Society and Government Specifications. For a copy, write **Union Carbide Plastics Company**, 270 Park Ave., New York 17, N. Y., for Kabelitems No. 111.

STAINLESS STEEL WIRE



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Phosphor Bronze, Spring Temper—Pure Iron Wire—Resistance Wire,
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EXHIBITS AT THE CONVENTION

The Wire Association has arranged with the LaSalle Hotel to use the commodious Illinois Room on the mezzanine floor for exhibits. Many suppliers have availed themselves of this opportunity to show and demonstrate their products during the Convention. All in attendance are invited to see these exhibits.

A few spaces are still available.

Write for layout and cost data.

WIRE AND WIRE PRODUCTS

453 Main St. **Stamford, Conn.**

Montgomery Buys New England Electrical Works

The Montgomery Company, Windsor Locks, Conn., has acquired **New England Electrical Works, Inc.**, of Lisbon, New Hampshire. This acquisition is Montgomery's first major step in its plan for corporate growth through entry into related fields.

* * *

Since 1898, New England has manufactured specialty stranded and braided wire and cable, primarily from copper and copper alloys. New England's conductors go to a large number of customers who are supplying a broad cross-section of the electrical-electronic market. Specialty conductors such as Litz wire are found in commercial radio and radio-telephones, communication carrier equipment, computers, instruments for measuring and testing, ultrasonics, atomic submarine and missile communication equipment.

* * *

Founded in 1871, Montgomery has pioneered in the development and production of flexible uninsulated electrical tinsel conductors for the communication and appliance fields. The addition of New England's skills in forming braiding and combining special wires to Montgomery's long-established abilities as a tinsel conductor specialist, will provide customers of both organizations with a much broader-based and more beneficial source for wire specialties.

* * *

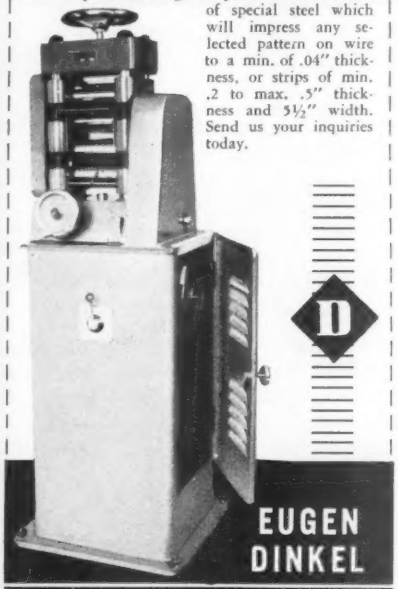
New England's name will remain and it will stay in Lisbon, operating as a subsidiary of Montgomery, under the direction of its present General Manager, **Lewis H. Dumdey.**

Catalog of Wire Drawing Lubricants Issued by Miller

R. H. Miller Company, Inc., of Homer, New York, specialists in the production of metal working lubricants, has recently made available a complete folder of its product specifications.

DOUBLE ROLLING-MILL

A wire and strip 'engraving' machine, producing numerous patterns in demand by jewelry manufacturers and allied industries. The same machine is used also as a conventional rolling mill for wire or sheet stock. This new machine, imported from West Germany in several models, allows quick exchange of pattern rollers made of special steel which will impress any selected pattern on wire to a min. of .04" thickness, or strips of min. .2 to max. .5" thickness and 5½" width. Send us your inquiries today.



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The folder deals with the variations of Miller's three trademarked working compounds: "Steelskin," for steel drawing; "Redskin," for copper coating of steel; and "Copperskin," for drawing copper and its alloys.

* * *

"Steelskin" literature describes its soluble soap powders; insoluble or metallic stearate soap powders, including Molysulfide lubricant; coating compounds; water and oil type greases; and stamping compounds.

* * *

The "Redskin" material covers its coating compound and "Redskin Shield" protective powder. Specification sheets for "Copperskin" complete the folder.

* * *

Copies of the folder can be obtained from the R. H. Miller Company or through its representatives.

New Tension Meter for Moving Wires and Yarns

Featuring a mechanical 3-roller shunt and low-inertia pulleys rotating on precise ball bearings, the new and improved Saxl Tension Meter is quickly clipped in wires and yarns that move at high speeds. Due to the shunt, the wire is hardly shortened. The new Tension Meter thus gives correct readings even if free distances of traveling filaments are short.

* * *

Its dual range, two color dial makes one Tension Meter the equivalent of two instruments with a scale over 12½ inches long. The Tension Meter has greatly extended resolution on the lower end of the scale where the most critical tensions lie. In addition, it extends dial range over 100% beyond the first revolution of the pointer.

* * *

The instrument's damping has been increased for applications where it is advisable to "average out" excessive oscillations of tension. The light weight and non-slip grip minimize operators' fatigue.

* * *

Each of these instruments has a registered serial number just like a fine camera or microscope. Made by **Tensitron, Inc.**, P. O. Box 185, Harvard, Mass.

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New Line of Large Extruders For Heavy Volume Producers

A new series of air-cooled, plastic extruding machines, particularly suited to large volume users, is now available.

* * *

Produced by **Modern Plastic Machinery Corporation,** the new extruders are made with 6 and 8-inch diameter screws as standard equipment while 10 and 12-inch barrels are made to special order.

* * *

All four sizes are available in vented or non-vented design and in L/D ratios of 20:1 and 24:1, and all units are supplied with resistance-band or cast-in heaters.

* * *

A unique feature of MPM extruders is their integrated construction — every major component is designed and precision-built in the MPM plant.

* * *

For further information, write Modern Plastic Machinery Corp., 64 Lakeview Ave., Clifton, N. J.

Silver Plated Stainless Steel Strands

Silver plated stainless steel strands developed for use as strength members in stranded conductors are now available on a pilot plant basis from **Hudson Wire Company's** Ossining Division.

* * *

Because of its high tensile strength, stainless steel strands are desirable as reinforcing members in stranded conductors. However, the non-solderability of stainless steel has been a problem to the electronics and related industries. With Hudson's unique process for silver plating stainless steel, the strength member can now be soldered with an adherence equal to plated copper strands.

* * *

For additional information, contact Hudson Wire Company, Ossining Division, Ossining, New York.

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National Electrical Week

The dates for National Electrical Week have been set for February 5-12, 1961, according to an announcement made by the National Electrical Week Committee, 407 No. 8th St., St. Louis 1, Mo.

* * *

This annual observance represents the culmination of the combined efforts of all branches of the electrical industry, from power companies, manufacturers of electric wire and producers of electrical appliances down to the contractor who performs installation and wiring services. The purpose of the "Week" is to enhance public appreciation of electricity, of adequate wiring, and of the contributions of the electrical industry to the nation's progress and economy.

Warren Wire Appoints New England Sales Manager

Warren Wire Company, Pownal, Vt., has announced the appointment of Robert G. Bailey as New England area sales manager, with his office located at 100 Everett St., Westwood, Mass., near Boston.

* * *

Mr. Bailey will handle the company's full line of magnet wire, bare and tinned copper wire, lead wire and aircraft cable, and Teflon coated glass fabric, yarn and cordage.

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Vaughn No. 8, 10, & 12 Moto-Blocs
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Replies will be treated confidentially.
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Wire Kinks

(*Continued from page* 1137)

which quickly heats the wire uniformly throughout its cross section and it enters a lead bath quench when at its maximum temperature. The wire is considered to be harder and have higher tensile strength than can be produced in a conventional furnace, due to the fact that electrically patented stock is more sorbitic, that is, the carbide is dispersed in such extremely thin plates that they are not discernable at magnifications of 2000 to 3000 diameters.

Some Problems on Studies of Thermal Evaluation of Magnet Wire

(*Continued from page* 1146)

(8) L. C. Whitman, W. W. Whitman: Communication and Electronics, p. 308 Sept (1959)
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(10) H. L. Saums, W. W. Pendelton: Communication and Electronics, p. 1 Mar. (1959)
(11) T. Ogawa, M. Miyairi: Hitachi Hyoron, Special Issue for Insulating Materials: p: 29 July (1959)
(12) J. F. Dexter: E. E. Vol. 75 No. 3, p. 258 (Mar. 1956)
(13) K. Mase: Wire and Wire Products, p. 714 June (1959)

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Thoroughly experienced stainless round and flat wire salesman able to purchase $25,000.00 of Company stock, and participate full time as Sales V.P. in small Midwest stainless and specialty wire mill now being organized and incorporated. Send complete resume in confidence to principal.
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WHERE TO BUY

For more complete information, consult the annual Wire and Wire Products Buyer's Guide. Advertisers who have contracted for 6 or more insertions are entitled to up to 8 listings in this section of Wire and Wire Products.

ABRASIVES—
Elgin National Watch Co., Abrasives Div., Elgin, Ill.
Hyprez Div., Engis Equipment Co., Chicago, Ill.
Norton Co., Worcester, Mass.
Pangborn Corporation, Hagerstown, Md.

ABRASIVES— Shot & Grit, For Cleaning
Pangborn Corporation, Hagerstown, Md.

ACID INHIBITORS—
(See Inhibitors, Pickling)

ANNEALING MACHINES — Electric Resistance
Syncro Machine Co., Perth Amboy, N. J.

ANNEALING POTS AND BOXES—
Scudder, E. J. Fdry. & Mach. Co., Trenton, N. J.

BAKERS—
(See OVENS—Rod Bakers)

BOBBINS—Braider & Wire Weaving
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Associated American Winding Machinery, Inc., New York, N. Y.
Molded Fiber Glass Tray Co., Linesville, Pa.
Mossberg Pressed Steel Corp., Division of Wanskuck Co., Attleboro, Mass.
Plastic Mold & Engineering Co., Providence, R. I.
Standard Mill Supply Co., Pawtucket, R. I.
Wardwell Braiding Machine Co., Central Falls, R. I.
Western Wire & Textile Machinery, Inc., So. San Francisco, Calif.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

BORAX—Wire Drawing
U. S. Borax, New York, N. Y.

BORON CARBIDE—
Norton Co., Worcester, Mass.

CABLE FILLERS—Paper
Ludlow Papers, Needham Heights, Mass.
Plymouth Cordage Company, Plymkraft Division, Plymouth, Mass.
Twitchell, Inc., E. W., Philadelphia, Pa.

CAPSTANS—for Wire (also Caterpiller Types)
Bartell Machine Tool Corp., Rome, N. Y.
Colbourne Machine Company, Winsted, Conn.
Coulter & McKenzie Machine Co., Bridgeport, Conn.
Davis Electric Co., Wallingford, Conn.
Enjaco Corporation, Cranston, R. I.
Entwistle Manufacturing Corporation, Providence, R. I.
Federal Manufacturing Company, Wallingford, Conn.
General Engineering Company (Radcliffe) Limited, Radcliffe, England
Larmuth & Bulmer Limited, Manchester, England

CARRIERS—Braider, High Speed
Apco Mossberg Co., Attleboro, Mass.
Carter & Co., Ltd., B. & F., Bolton, England
Mossberg Pressed Steel Corp., Division of Wanskuck Co., Attleboro, Mass.
New England Butt Co., Division of Wanskuck Co., Providence, R. I.
Wardwell Braiding Machine Co., Central Falls, R. I.
Western Wire & Textile Machinery, Inc., So. San Francisco, Calif.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

CASTINGS—Wire Mill
Scudder, E. J. Fdry. & Mach. Co., Trenton, N. J.

CEMENTS—Refractory
Norton Co., Worcester, Mass.
Amchem Products, Inc., Ambler, Pa.

CLEANERS—Metal
Apex Alkali Products Co., Phila., Pa.
Magnuson Products Corporation, Brooklyn, N. Y.
Miller, R. H., Co., Inc., Homer, N. Y.
Parkin Chemical Co., The, Pittsburgh, Pa.
Standard Industrial Compounds Co., Frankfort, Ill.

CLEANING & PICKLING EQUIP.—
Cleveland Tramrail Div., of the Cleveland Crane & Engineering Co., Wickliffe, Ohio
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, Ohio
Wilson, Lee, Engr. Co., Cleveland, Ohio

CLOTH—WIRE, All Metals
Hudson Wire Co., Pequot Div., Norwalk, Conn.
Wickwire Bros., Cortland, N. Y.
Wisconsin Wire Works, Appleton, Wis.

COATING COMPOUNDS—
Apex Alkali Products Co., Philadelphia, Pa.
Magnuson Products Corporation, Brooklyn, N. Y.
Miller, R. H., Co., Homer, N. Y.
Parker Rust Proof Co., Detroit, Michigan
Standard Industrial Compounds Co., Frankfort, Ill.
U. S. Borax, New York, N. Y.

COLOR CONCENTRATES—For Wire Coatings
Blane Corporation, The, Canton, Mass.

COMPOUNDS—Coppering
Amchem Products, Inc., Ambler, Pa.
Miller, R. H. Co., Inc., Homer, N. Y.

COMPOUNDS—Diamond (Pre-Mixed)
Eastern Carbide Corp., New Rochelle, N. Y.
Elgin National Watch Co., Abrasives Div., Elgin, Ill.
Hyprez Div., Engis Equipment Co., Chicago, Ill.
Rusch Wire Die Corporation, Croton-on-Hudson, N. Y.

COMPOUNDS—Extrusion, for Wire
Amchem Products, Inc., Ambler, Pa.
Blane Corporation, The, Canton, Mass.
Cary Chemicals, Inc., New Brunswick, N. J.
Monsanto Chemical Company, Plastics Division, Springfield, Mass.
U. S. Industrial Chemicals Company, Division of National Distillers & Chemical Corporation, New York, N. Y.

COMPOUNDS—For Improving Drawing & Extrusion
Amchem Products, Inc., Ambler, Pa.

COMPOUNDS—Metal Finishing
Amchem Products, Inc., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Parker Rust Proof Co., Detroit, Michigan

COMPOUNDS—Phosphate Coating
Amchem Products Inc., Ambler, Pa.
Parker Rust Proof Co., Detroit, Michigan

COMPOUNDS—Rust Preventing
Amchem Products, Inc., Ambler, Pa.
American Lanolin Corporation, Lawrence, Mass.
Apex Alkali Products Co., Philadelphia, Pa.
Parker Rust Proof Co., Detroit, Michigan

COMPOUNDS—Rust Removing
Amchem Products, Inc., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Magnuson Products Corporation, Brooklyn, N. Y.
Standard Industrial Compounds Co., Frankfort, Ill.

COMPOUNDS—Vinyl
Blane Corporation, The, Canton, Mass.
Cary Chemicals, Inc., New Brunswick, N. J.
Escambia Chemical Corporation, New York, N. Y.
Monsanto Chemical Company, Plastics Division, Springfield, Mass.
Union Carbide Plastics Company, Div. of Union Carbide Corporation, New York, N. Y.

COMPOUNDS—Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Magnuson Products Corporation, Brooklyn, N. Y.
Miller, R. H. Co., Inc., Homer, N. Y.
Standard Industrial Compounds Co., Frankfort, Ill.
Swift & Company, Chicago, Ill.
U. S. Borax, New York, N. Y.

CONDUCTORS—Flexible, Electrical
Hudson Wire Co., Ossining, N. Y.
Montgomery Co., The, Windsor Locks, Conn.

CONTAINERS—Wire Packaging
(See DRUMS—Wire Packaging)

COPHOLDERS—Steel
Apco Mosberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Division of Wanskuck Co., Attleboro, Mass.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

CORDS—Electrical, Tinsel Conductor
Montgomery Co., The, Windsor Locks, Conn.

COUNTERS—
(See MACHINERY—Measuring Wire and Cable)

CRANES—Wire Mill
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, Ohio

CUTTING TOOLS—Carbide
Eastern Carbide Corp., New Rochelle, N. Y.
Metallurgical Products Dept. of General Electric Co., Detroit, Mich.

CUTTING TOOLS—Wire
Manco Mfg. Co., Bradley, Ill.
Robinson, M. W. Co., Rockville, Conn.

DIAMONDS—Industrial
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Wayne Wire Die Co., Linden, N. J.

DIAMOND POWDERS—
Alabama Wire Die Co., Fayette, Ala.
Danforth Company, C.W., Youngstown, Ohio
Elgin National Watch Co., Abrasives Div., Elgin, Ill.
Fort Wayne Diamond Products, Inc., Fort Wayne, Indiana
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
Hyprez Div., Engis Equipment Co., Chicago, Ill.
Indiana Wire Die Co., Ft. Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
New England Wire Die Co., Worcester, Mass.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Wayne Wire Die Co., Linden, N. J.

DIAMOND POWDER RECLAIMING—
Danforth Company, C.W., Youngstown, Ohio
Elgin National Watch Co., Abrasives Div., Elgin, Ill.
Fort Wayne Diamond Products, Inc., Fort Wayne, Indiana
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.

DIAMOND TOOLS—
Alabama Wire Die Co., Fayette, Ala.
Indiana Wire Die Co., Ft. Wayne, Ind.
Wayne Wire Die Co., Linden, N. J.

DIES—Carbide, Tungsten & Tantalum
Alabama Wire Die Co., Fayette, Ala.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J., Inc., New York, N. Y.
Eastern Carbide Corp., New Rochelle, N. Y.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelloy Corporation, New York, N. Y.
Kelly Wire Die Corp., New York, N. Y.
Metallurgical Products Dept. of General Electric Co., Detroit, Mich.
Rivom, Dijon, France
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Wayne Wire Die Co., Linden, N. J.

DIES—Cold Heading
Alabama Wire Die Co., Fayette, Ala.
Eastern Carbide Corp., New Rochelle, N. Y.
Indiana Wire Die Co., Ft. Wayne, Ind.
Kelloy Corporation, New York, N. Y.
Metallurgical Products Dept. of General Electric Co., Detroit, Mich.
Rivom, Dijon, France

DIES—Diamond
Ajax Industrial Supplies, Inc., Ft. Wayne, Ind.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J. Inc., New York, N. Y.
Brenon, Inc., Nixon, N. J.
Ft. Wayne Wire Die Inc., Fort Wayne, Ind.
Hoosier Wire Die, Inc., Fort Wayne, Ind.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
National Wire Die Co., Inc., New York, N. Y.
New England Wire Die Co., Worcester, Mass.
Roux Wire Die Works, Inc., Oriskany, N. Y.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Wayne Wire Die Co., Linden, N. J.

DIES DIAMOND—Reversible
Alabama Wire Die Co., Fayette, Ala.
Indiana Wire Die Company, Fort Wayne, Indiana
National Wire Die Co., Inc., New York, N. Y.

DIES—Extrusion
Central Tool and Machine Co., Bridgeport, Conn.
Eastern Carbide Corp., New Rochelle, N. Y.
Kelloy Corporation, New York, N. Y.
Metallurgical Products Dept. of General Electric Co., Detroit, Mich.
Rivom, Dijon, France.
Rusch Wire Die Corp., Croton-on-Hudson, N.Y.
Wayne Wire Die Co., Linden, N. J.

DIES—Eyelet
Eastern Carbide Corp., New Rochelle, N. Y.
Kelloy Corporation, New York, N. Y.

DIES—Nail, Nail Cutters, Feeder Blocks, Grippers, etc.
Pittsburgh Carbide Die Co., Monongahela, Pa.

DIES—Pointing
Sjogren Tool and Machine Co., Auburn, Mass.

DIES—Repairs & Re-Cutting
Ajax Industrial Supplies, Inc., Fort Wayne, Ind.
Alabama Wire Die Co., Fayette, Ala.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J., Inc., New York, N. Y.
Brenon, Inc., Nixon, N. J.
Eastern Carbide Corp., New Rochelle, N. Y.
Ft. Wayne Wire Die, Inc., Fort Wayne, Ind.
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
Indiana Wire Die Co., Ft. Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metallurgical Products Dept. of General Electric Co., Detroit, Mich.
National Wire Die Co., Inc., New York, N. Y.
New England Wire Die Co., Worcester, Mass.
Roux Wire Die Works, Inc., Oriskany, N. Y.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Wayne Wire Die Co., Linden, N. J.

DIES—Roll Threading
Rivom, Dijon, France

DIES—Special Shapes, Etc.
Alabama Wire Die Co., Fayette, Ala.
Eastern Carbide Corp., New Rochelle, N. Y.
Indiana Wire Die Co., Ft. Wayne, Ind.
Kelloy Corporation, New York, N. Y.
Rivom, Dijon, France

DIES—Swaging
Sjogren Tool and Mach. Co., Inc., Auburn, Mass.

DIES—Tinning
Roux Wire Die Works, Inc., Oriskany, N. Y.

DIES—Tube Drawing
Alabama Wire Die Co., Fayette, Ala.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Eastern Carbide Corp., New Rochelle, N. Y.
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelloy Corporation, New York, N. Y.
Kelly Wire Die Corp., New York, N. Y.
Metallurgical Products Dept. of General Electric Co., Detroit, Mich.
Rivom, Dijon, France
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.

DRAW BENCHES—
(See MACHINERY—Draw Benches)

DRIVES—Variable Speed
Allis Co., Louis, Milwaukee, Wisc.

DRUMS—Wire Packaging
Hubbard Spool Company, Div., Van Norman Industries, Inc., Garrett, Ind.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.

DRUMS & TRAVERSES—For Cable Reels
Hubbard Spool Company, Div., Van Norman Industries, Inc., Garrett, Ind.
Republic Steel Corp., Berger Div., Canton, Ohio

DRYING EQUIPMENT—
Carl Mayer Corp., The, Cleveland, Ohio
Michigan Oven Company, Detroit, Mich.

DUST COLLECTORS—Wet or Dry
Pangborn Corporation, Hagerstown, Md.

EYELETS—Brass or Zinc
Platt Bros. & Co., The, Waterbury, Conn.

FOAM PRODUCING COMPOUNDS—
Amchem Products Inc., Ambler, Pa.
Parkin Chemical Co., The, Pittsburgh, Pa.

FURNACES—Brazing
Ajax Electric Company, Philadelphia, Pa.

FURNACES—Galvanizing Equipment
Ofenbau Fritz, G.m.b.H. & Co., K. G. Hagen (W. Germany)
Wilson, Lee, Engr. Co., Cleveland, Ohio

FURNACES—Heat Treating
Ajax Electric Company, Philadelphia, Pa.
Carl Mayer Corp., The, Cleveland, Ohio
Ofenbau Fritz, G.m.b.H. & Co. K. G. Hagen, (W. Germany)
Wilson Lee Engr. Co., Cleveland, Ohio

FURNACES—Pot (Oil, Gas, Electric)
Ajax Electric Company, Philadelphia, Pa.
Ofenbau Fritz, G.m.b.H. & Co. K. G. Hagen, (W. Germany)

FURNACES—Salt Bath
Ajax Electric Company, Philadelphia, Pa.

FURNACES—Strand Annealing
Ajax Electric Company, Philadelphia, Pa.
Ofenbau Fritz, G.m.b.H. & Co. K. G. Hagen, (W. Germany)

GALVANIZING EQUIPMENT—(See MACHINERY—Galvanizing Wire)

GRINDERS—Roll
Norton Co., The, Worcester, Mass.

GUIDES—For Wire
Heany Industrial Ceramic Corp., New Haven, Conn.

GUIDE TIPS—For Extruding Machines (See NOZZLES)

HAMMERS—Nail Heading
Pittsburgh Carbide Die Co., Monongahela, Pa.

HAMMERS—Swaging
Sjogren Tool and Machine Co., Auburn, Mass.

HOISTS—Electric Travelling
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio

INHIBITORS—Pickling
Apex Alkali Products Co., Philadelphia, Pa.
Parkin Chemical Co., The, Pittsburgh, Pa.

INKS—Printing, for Insulated Wire
Entwistle Manufacturing Corporation, Providence, R. I.
Gem Gravure Company, West Hanover, Mass.

INSULATING MATERIALS—
Blane Corporation, The, Canton, Mass.
Cary Chemicals, Inc., New Brunswick, N. J.
General Electric Company, Insulating Materials Section, Schenectady, N. Y.
Monsanto Chemical Company, Plastics Division, Springfield, Mass.
Plymouth Cordage Company, Plymkraft Division, Plymouth, Mass.
U. S. Industrial Chemicals Company, Division of National Distillers & Chemical Corporation, New York, N. Y.
United States Rubber Company, Naugatuck Chemical Division, Naugatuck, Conn.

LACQUERNG SYSTEMS—See MACH.—Lacquering Electric Wire

LAME—LAHN—
Montgomery Co., The, Windsor Locks, Conn.

LIME—
Warner Co., The, Philadelphia and Bellefonte, Pa.

LUBRICANTS—For Metal Cutting, Stamping and Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Miller, R. H., Co., Inc., Homer, N. Y.
Standard Industrial Compounds Co., Frankfort, Ill.

LUBRICANTS—Wire Drawing
(See Compounds—Wire Drawing)

LUBRICANTS—Wire Rope
Swift & Co., Chicago, Ill.

MACHINE CONTROLS—Electronic
Allis Co., Louis, Milwaukee, Wisc.

MACHINERY—Armoring (Cable, Wire, Hose)
American Insulating Mach'y Co., Phila., Pa.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.
Western Wire & Textile Machinery, Inc., So. San Francisco, Calif.
Wire & Textile Mach'y, Inc., (used), Pawtucket, R. I.

MACHINERY—Barbed Wire
Glader Wm., Machine Works, Chicago, Ill.

MACHINERY—Blast Cleaning
Pangborn Corporation, Hagerstown, Md.
Wheelabrator Corporation, Mishawaka, Ind.

MACHINERY—Bobbin Winders
Associated American Winding Machinery, Inc., New York, N. Y.
Hanson & Edwards, Ltd., Warrington, England
Larmuth and Bulmer, Limited, Manchester, England

MACHINERY—Bolt, Rivet, Screw, etc.
Boltmaster Co., The, Cleveland, Ohio
National Machinery Co., Tiffin, Ohio
Prutton Corporation, Cleveland, Ohio.
Straus-Artys Corp., Great Neck, N. Y.

MACHINERY—Braiding
New England Butt Co., Division of Wanskuck Co., Providence, R. I.
Wardwell Braiding Machine Co., Central Fall, R. I.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Bunching
Cook Manufacturing Co., The, Paterson, N. J.
Edmands Company, The, Cranston, R. I.
Hanson & Edwards, Ltd., Warrington, England
Haskell-Dawes Machine Co., Philadelphia, Pa.
Larmuth and Bulmer, Limited, Manchester, England
Miyazaki Iron Works, Ltd., Osaka, Japan
New England Butt Co., Division of Wanskuck Co., Providence, R. I.
Niehaus K. A. Maschinenfabrik, Dusseldorf-Rath, Germany
Watson Machine Co., Paterson, N. J.
Western Wire & Textile Machinery, Inc., So. San Francisco, Calif.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Bundling, Scrap
Vaughn Machinery Co., Cuyahoga Falls, Ohio

MACHINERY—Cable, Electric
American Insulating Mach'y Co., Phila., Pa.
Carter & Co., Ltd., B. & F., Bolton, England
Cook Mfg. Co., The, Paterson, N. J.
Haskell-Dawes Machine Co., Philadelphia, Pa.
Larmuth and Bulmer, Limited, Manchester, England
New England Butt Co., Division of Wanskuck Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Capstans (See Capstans and Machinery—Winding Wire)

MACHINERY—Centerless Grinding & Polishing
American Laubscher Corporation, New York, N. Y.

MACHINERY—Chain Link Fence
Norton & Co., Ltd., Sir James Farmer, Manchester, England
Steel & Wire Machinery Co., Cleveland, Ohio
Wafios Machinery Corp., Hackensack, N. J.

MACHINERY—Chain Making
Larmuth and Bulmer, Limited, Manchester, England
Steel & Wire Machinery Co., Cleveland, Ohio
Wafios Machinery Corp., Hackensack, N. J.

MACHINERY—Closing Cable
Carter & Co., Ltd., B. & F. Bolton, England
Larmuth and Bulmer, Limited, Manchester, England
Miyazaki Iron Works, Ltd., Osaka, Japan
Niehaus, K. A. Maschinenfabrik, Dusseldorf-Rath, Germany
Watson Machine Co., Paterson, N. J.

MACHINERY—Coiling Rod
Coulter & MacKenzie Machine Co., Bridgeport, Conn.
Vaughn Mach'y Co., Cuyahoga Falls, Ohio

MACHINERY—Cold Heading
Boltmaster Co., The, Cleveland, Ohio
National Machinery Co., Tiffin, Ohio
Straus-Artys Corp., Great Neck, N. Y.

MACHINERY—Copper Wire Drawing
American Insulating Mach'y Co., Phila., Pa.
Cook Mfg. Co., The, Paterson, N. J.
Herborn Machinery Corporation, Hackensack, N. J.
Johnson Machinery Co., Elizabeth, N. J.
Morgardshammars Mek Verkstads A. B., Morgardshammar, Sweden
National Mach'y Exch (Used). New York
Showa Machine Works, Ltd., Osaka, Japan
Steel & Wire Machinery Co., Cleveland, Ohio
Straus-Artys Corp., Great Neck, N. Y.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, Ohio
Watkins & Sons, Inc., R. S. Sandy Hook, Conn.
Whitacre Corporation, Alhambra, California

MACHINERY—Covering Wire (See MACHINERY—Insulating Wire)
Eisler Engineering Company, Newark, N. J.
Lewis Machine Co., The, Cleveland, Ohio
Loma Machine Manufacturing Co., Inc., New York, N. Y.
Mettler Machine Tool, Inc., New Haven, Conn.
Wire Machinery, Inc., Chicago, Ill.

MACHINERY—Cutters, Hydraulic for Rod & Bar
Manco Mfg. Co., Bradley, Ill.

MACHINERY—Dead Block (Stationary Coiler)
Morgan Construction Company, Worcester, Mass.
Wells Company, Frank L., Kenosha, Wisc.
Whitacre Corporation, Alhambra, California
Wire Machinery, Inc., Chicago, Ill.

MACHINERY—Descaling Rod, Dry
Coulter & McKenzie Machine Co., Bridgeport, Conn.
Fisher Associates, New York, N. Y.
Herborn Machinery Corporation, Hackensack, N. J.
Pangborn Corporation, Hagerstown, Md.
Wheelabrator Corporation Mishawaka, Ind.
Wire Machinery, Inc., Chicago, Ill.

MACHINERY—Diameter Control
Muirhead Instruments, Inc., (Addison Electric), New York, N. Y.
National Standard Electronics, Inc., New York, N. Y.

MACHINERY—Die Making
Boulin, Victor J., Inc., New York, N. Y.
Dykrex Corp., Roos Tool & Mfg. Div., Newark, N. J.
Mettallurgical Products Dept. of General Electric Co., Detroit, Mich.
Sjogren Tool & Machine Co., Auburn, Mass.
Wayne Wire Die Co., Linden, N. J.

MACHINERY—Draw Benches
American Laubscher Corporation, New York, N. Y.
Loma Machine Manufacturing Co., Inc., New York, N. Y.
Morgan Construction Co., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, Ohio.
Wire Machinery, Inc., Chicago, Ill.

MACHINERY—Eccentricity Control (Insulated Wire)
Muirhead Instruments, Inc., (Addison Electric), New York, N. Y.
National Standard Electronics, Inc., New York, N. Y.

MACHINERY—Edging (See MACHINERY—Tandem Rolling and Edging Mills)

MACHINERY—Enameling
Acrometal Products, Inc., Minneapolis, Minn.
American Insulating Mach'y Co., Phila., Pa.
Cook Manufacturing Co., The, Paterson, N.J.
Litzler Co., C. A. Cleveland, Ohio
Michigan Oven Company, Detroit, Mich.

MACHINERY—Extruding
Davis-Standard Division of Franklin Research Corporation, Mystic, Conn.
General Engineering Company (Radcliffe) Limited, Radcliffe, England
Johnson Machinery Co., Elizabeth, N. J.
Royle, John, & Sons, Paterson, N. J.
Western Wire & Textile Machinery, Inc., So. San Francisco, Calif.
Wire & Textile Mach'y, Inc (used) Pawtucket, R. I.

MACHINERY—Fence
Glader, Wm., Machine Works, Chicago, Ill.
Norton & Co., Ltd., Sir James Farmer, Manchester, England
Wafios Machinery Corp., Hackensack, N. J.

MACHINERY—Flat Wire
Fenn Manufacturing Company, Newington, Conn.
Herborn Machinery Corporation, Hackensack, N. J.
Mettler Machine Tool, Inc., New Haven, Conn.
Steel Equipment Company, Cleveland, Ohio
Steel & Wire Machinery Co., Cleveland, Ohio
Torrington Mfg. Co., Torrington, Conn.
Watkins & Sons, Inc., R. S., Sandy Hook, Conn.

MACHINERY—Forming Wire
National Mach'y Exch. (Used), New York, N. Y.
Nilson Machine Co., A. H., Shelton, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Steel & Wire Machinery Co., Cleveland, Ohio
Straus-Artys Corp., Great Neck, N. Y.
Wafios Machinery Corp., Hackensack, N. J.

MACHINERY—Footage Meters
National Standard Electronics Inc., New York, N. Y.

MACHINERY—Galvanizing Wire
Miyazaki Iron Works, Ltd., Osaka, Japan
Ofenbau Fritz G.m.b.H. & Co. K. G., Hagen, (W.-Germany)
Steel & Wire Machinery Co., Cleveland, Ohio
Vaughn Machinery Co., Cuyahoga Falls, Ohio
Whitacre Corporation, Alhambra, California
Wilson, Lee, Engr. Co., Cleveland, Ohio

MACHINERY—Gang Winders
Entwistle Manufacturing Corporation, Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Grinding
Norton Co., The, Worcester, Mass.

MACHINERY—Impregnation Control, Paper Cables
Muirhead Instruments, Inc., (Addison Electric), New York, N. Y.

MACHINERY—Insulating Wire
American Insulating Mach'y Co., Phila., Pa.
Davis Electric Co., Wallingford, Conn.
Davis-Standard Division of Franklin Research Corporation, Mystic, Conn.
Litzler Co., C. A., Cleveland, Ohio
Michigan Oven Company, Detroit, Mich.
New England Butt Co., Division Wanskuck Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Pourtier Pere et Fils, Romainville (Seine), France
Royle, John & Sons, Paterson, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Wardwell Braiding Machine Co., Central Falls, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Insulation Testing (See MACHINERY—Spark Testing)

MACHINERY—Lacquering Electric Wire
American Insulating Mach'y Co., Philadelphia, Pa.
Cook Mfg. Co., The, Paterson, N. J.
Litzler Co., C. A., Cleveland, Ohio
Michigan Oven Company, Detroit, Mich.

MACHINERY—Lock Washer
Sleeper & Hartley, Inc., Worcester, Mass.
Wafios Machinery Corp., Hackensack, N. J.

MACHINERY—Looms, Wire Weaving
EVG., Machinen & Stahl, A. G., Zurich, Switzerland

MACHINERY—Material Handling
(See Material Handling Equipment)

MACHINERY—Measuring Diam., Insulated Wire
Muirhead Instruments, Inc., (Addison Electric), New York, N. Y.
National Standard Electronics, Inc., New York, N. Y.

MACHINERY—Measuring Wire & Cable
Davis Electric Co., Wallingford, Conn.
Durant Mfg. Co., Milwaukee, Wisc.
Enjaco Corporation, Cranston, R. I.
Entwistle Manufacturing Corporation, Providence, R. I.
Federal Manufacturing Company, Wallingford, Conn.
General Engineering Company (Radcliffe) Limited, Radcliffe, England
Larmuth and Bulmer, Limited, Manchester, England
National Standard Electronics, Inc., New York, N. Y.
New England Butt Co., Division Wanskuck Co., Providence, R. I.
Standard Mill Supply Co., Pawtucket, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Measuring and Control—Coating
National Standard Electronics, Inc., New York, N. Y.

MACHINERY—Measuring Width-Flat Wire
National Standard Electronics, Inc., New York, N. Y.

MACHINERY—Nail and Tack
Glader, Wm., Machine Works, Chicago, Ill.
National Machinery Co., Tiffin, Ohio
National Mach'y Exch. (Used), N.Y., N.Y.
Wafios Machinery Corp., Hackensack, N. J.

MACHINERY—Packaging Wire
Advanced Wyrepak Co., Inc., Bridgeport, Conn.
Coulter & McKenzie Machine Co., Bridgeport, Conn.
Whitacre Corporation, Alhambra, California

MACHINERY—Patenting Wire
Ofenbau Fritz G.m.b.H. & Co. K. G., Hagen, (W.-Germany)
Whitacre Corporation, Alhambra, California

MACHINERY—Pin Making
Nilson Machine Co., A. H., Shelton, Conn.

MACHINERY—Plating
Bartell Machine Tool Corp., Rome, N. Y.
Universal Industrial Equipment Co., Secaucus, N. J.

MACHINERY—Pointing
Herborn Machinery Corporation, Hackensack, N. J.
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch. (Used), New York, N. Y.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Straus-Artys Corp., Great Neck, N. Y.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, Ohio

MACHINERY—Printing on Electric Wire
Enjaco Corporation, Cranston, R. I.
Entwistle Manufacturing Corporation, Providence, R. I.
Gem Gravure Company, West Hanover, Mass.
Gillies, Duncan M. Co., Inc., West Boylston, Mass.

MACHINERY—Re-Spooling
Acrometal Products, Inc., Minneapolis, Minn.
Associated American Winding Machinery, Inc., New York, N. Y.
Bartell Machine Tool Corp., Rome, N. Y.
Colbourne Machine Company, Winsted, Conn.
Coulter & McKenzie Machine Co., Bridgeport, Conn.
Davis Electric Co., Wallingford, Conn.
Emory Company, Robert J., Newark, N. J.
Enjaco Corporation, Cranston, R. I.
Entwistle Manufacturing Corporation, Providence, R. I.
Federal Manufacturing Company, Wallingford, Conn.
Herborn Machinery Corporation, Hackensack, N. J.
Miyazaki Iron Works, Ltd., Osaka, Japan
National Mach'y Exch. (Used), New York, N. Y.
Vaughn Machinery Co., Cuyahoga Falls, Ohio
Watson Machine Co., Paterson, N. J.
Western Wire & Textile Machinery, Inc., So. San Francisco, Calif.
Wire & Textile Mach'y Inc. (used) Pawtucket, R. I.

MACHINERY—Rod Mill
Baldwin-Lima-Hamilton, Industrial Division, New York, N. Y.
Herborn Machinery Corporation, Hackensack, N. J.
Morgan Construction Co., Worcester, Mass.

MACHINERY—Rolling Mill
Fenn Manufacturing Company, Newington, Conn.
Loma Machine Manufacturing Co., Inc., New York, N. Y.
Morgan Construction Co., Worcester, Mass.
Sleeper & Hartley, Inc., Worcester, Mass.
Watkins & Sons, Inc., R. S., Sandy Hook, Conn.

MACHINERY—Rubber Insulating
Davis-Standard Division of Franklin Research Corporation, Mystic, Conn.
Litzler Co., C. A., Cleveland, Ohio.
Royle, John & Sons, Paterson, N. J.
Western Wire & Textile Machinery, Inc., So. San Francisco, Calif.
Wire & Textile Mach'y Inc., (used) Pawtucket, R. I.

MACHINERY—Serving
Pourtier Pere et Fils, Romainville (Seine), France
Wardwell Braiding Machine Co., Central Falls, R. I.

MACHINERY—Slitting Mills
Steel Equipment Company, Cleveland, Ohio

MACHINERY—Special
Watkins & Sons, Inc., R. S., Sandy Hook, Conn.

MACHINERY—Spring Making
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Wafios Machinery Corp., Hackensack, N. J.
Wells Company, Frank L., Kenosha, Wisc.

MACHINERY—Straightening & Cutting
American Laubscher Corporation, New York, N. Y.
Johnson Machinery Co., Elizabeth, N. J.
Lewis Machine Co., The, Cleveland, Ohio
Loma Machine Manufacturing Co., Inc., New York, N. Y.
Mettler Machine Tool Co., New Haven, Conn.
National Mach'y Exch. (Used), New York, N. Y.
Patterson, George C. Machine Co., Cleveland Ohio
Sleeper & Hartley, Inc., Worcester, Mass.
Steel & Wire Machinery Co., Cleveland, Ohio
Wafios Machinery Corp., Hackensack, N. J.
Wells Company, Frank L., Kenosha, Wisc.

MACHINERY—Stranding
Bartell Machine Tool Corp., Rome, N. Y.
Carter & Co., Ltd., B. & F., Bolton, England
Hanson & Edwards, Ltd., Warrington, England
Haskell-Dawes Machine Co., Philadelphia, Pa.
Johnson Machinery Co., Elizabeth, N. J.
Krupp, Fried., Machienn-Und Stahlbau Rheinhausen, Germany
Larmuth & Bulmer Limited, Manchester, England
Miyazaki Iron Works, Ltd., Osaka, Japan
New England Butt Co., Division Wanskuck Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Superior Tool & Manufacturing Company, Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Swaging
Fenn Manufacturing Company, Newington, Conn.

MACHINERY—Tandem Rolling & Edging Mills
Fenn Manufacturing Company, Newington, Conn.

MACHINERY—Take-Up and Pay-Out
Acrometal Products, Inc., Minneapolis, Minn.
Advanced Wyrepak Co., Inc., Bridgeport, Conn.
American Insulating Mach'y Co., Phila., Pa.
Associated American Winding Machinery, Inc., New York, N. Y.
Bartell Machine Tool Corp., Rome, N. Y.
Colbourne Machine Company, Winsted, Conn.
Coulter & McKenzie Machine Co., Bridgeport, Conn.
Davis Electric Co., Wallingford, Conn.
Davis-Standard Division of Franklin Research Corporation, Mystic, Conn.
Enjaco Corporation, Cranston, R. I.
Entwistle Manufacturing Corporation, Providence, R. I.
Federal Manufacturing Company, Wallingford, Conn.
General Engineering Company (Radcliffe) Limited, Radcliffe, England
Johnson Machinery Co., Elizabeth, N. J.
Larmuth & Bulmer Limited, Manchester, England
Litzler Co., C. A., Cleveland, Ohio.

Miyazaki Iron Works, Ltd., Osaka, Japan
Niedhaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Pourtier Pere et Fils, Romainville (Seine) France
Standard Mill Supply Co., Pawtucket, R. I.
Steel Equipment Company, Cleveland, Ohio
Wardwell Braiding Machine Co., Central Falls, R. I.
Watson Machine Co., Paterson, N. J.
Whitacre Corporation, Alhambra, California

MACHINERY—Taping
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Division Wanskuck Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Pourtier Pere et Fils, Romainville (Seine) France
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Thread Rolling
Boltmaster Co., Cleveland, Ohio
Mettler Machine Tool, Inc., New Haven, Conn.
Prutton Corporation, Cleveland, Ohio.
Straus-Artys Corp., Great Neck, N. Y.
Wire Machinery, Inc., Chicago, Ill.

MACHINERY—Tinning Wire
American Insuating Mach'y Co., Phila., Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Litzler Co., C. A., Cleveland, Ohio
Ofenbau Fritz G.m.b.H. & Co. K. G., Hagen, (W.-Germany)
Syncro Machine Co., Perth Amboy, N. J.
Universal Industrial Equipment Co., Secaucus, N. J.
Whitacre Corporation, Alhambra, California

MACHINERY—Tinsel Rolling Mills
American Insulating Mach'y Co., Phila., Pa.

MACHINERY—Trolley Wire
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, Ohio

MACHINERY—Tube Mill, Cold Drawing
Johnson Machinery Co., Elizabeth, N. J.
Loma Machine Manufacturing Co., Inc., New York, N. Y.
Mettler Machine Tool, Inc., New Haven, Conn.

MACHINERY—Twinning
(See Mach.—Bunching)

MACHINERY—Twisters, Wire
Cook Manufacturing Co., The, Paterson, N.J.
Edmands Company, The, Cranston, R. I.
Haskell-Dawes Machine Co., Philadelphia, Pa.

MACHINERY—Used
Johnson Machinery Co., Elizabeth, N. J.
National Machinery Exchange, New York, N. Y.
Wire & Textile Machy., Inc., Pawtucket, R. I.
Wire Machinery, Inc., Chicago Ill.

MACHINERY—Welded Wire Mesh
EVG, Maschinen and Stahl, A.G., Zurich, Switzerland
Schlatter, Ltd., H. A. Zollikon/Zurich

MACHINERY—Variable Speed Drives
Allis Co., Louis Milwaukee, Wisc.

MACHINERY—for Wire Welding
(See WELDERS—Butt and Spot and Machinery—Welding Wire Fabrics)

MACHINERY—Winding Wire
Associated American Winding Machinery, Inc., New York, N. Y.
Davis Electric Co., Wallingford, Conn.
Emory Company, Robert J., Newark, N. J.
Enjaco Corporation, Cranston, R. I.
Federal Manufacturing Company, Wallingford, Conn.
Larmuth and Bulmer, Limited, Manchester, England
Miyazaki Iron Works, Ltd., Osaka, Japan
New England Butt Co., Division Wanskuck Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Standard Mill Supply Co., Pawtucket, R. I.
Steel Equipment Company, Cleveland, Ohio
Straus-Artys Corp., Great Neck, N. Y.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wire Drawing
American Laubscher Corporation, New York, N. Y.
Cook Manufacturing Co., The, Paterson, N.J.
Coulter & McKenzie Machine Co., Bridgeport, Conn.
Fenn Manufacturing Company, Newington, Conn.
Herborn Machinery Corporation, Hackensack, N. J.
Johnson Machinery Co., Elizabeth, N. J.
Loma Machine Manufacturing Co., Inc., New York, N. Y.
Miyazaki Iron Works, Ltd., Osaka, Japan
Morgan Construction Co., Worcester, Mass.
Morgardshammars Mek Verkstads AB, Morgardshammar, Sweden
National Mach'y Exch. (Used), New York, N. Y.
Norton &Co., Ltd., Sir James Farmer, Manchester, England
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Showa Machine Works Ltd., Osaka, Japan
Sleeper & Hartley, Inc., Worcester, Mass.
Societa Generale Delle Macchine Mill, Milan, Italy
Steel Wire and Machinery Co., Cleveland, Ohio
Straus-Artys Corp., Great Neck, N. Y.
Superior Tool & Machinery Company, Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, Ohio
Watkins & Sons, Inc., R. S., Sandy Hook, Conn.
Whitacre Corporation, Alhambra, California
Wire Machinery Inc., Chicago, Ill.

MACHINERY—Wire Preheating
Muirhead Instruments, Inc., (Addison Electric), New York, N. Y.

MACHINERY—Wire Rope
Larmuth and Bulmer, Limited, Manchester, England
New England Butt Co., Division Wanskuck Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Watson Machine Co., Paterson, N. J.

MACHINERY—Wrapping with Paper
American Laubscher Corp, New York, N. Y.
Terkelsen Machine Company, Boston, Mass.

MATERIAL HANDLING EQUIPMENT—
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, Ohio

MOTORS—Electric
Allis Co., Louis, Milwaukee, Wisc.

NAIL TOOLING—Tungsten Carbide
Pittsburgh Carbide Die Co., Monongahela, Pa.

NAILS—Wire
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Pan American Trade Development Corp., New York, N. Y.
Wickwire Brothers, Inc., Cortland, N. Y.

NIPPERS—Wire Cutting
Robinson, M. W. Co., Rockfall, Conn.

NOZZLES—For Extruding Machines
Central Tool and Machine Co., Bridgeport, Conn.

OVENS—Cable Lacquering and Enameling
American Insulating Mach'y Co., Phila., Pa.
Carl Mayer Corp., The, Cleveland, Ohio
Colbourne Machine Company, Winsted, Conn.
Michigan Oven Company, Detroit, Mich.

OVENS—Rod Bakers
Carl Mayer Corp., The, Cleveland, Ohio

OVENS—Welding Rod Coating
Carl Mayer Corp., The, Cleveland, Ohio

PAILS—Packaging
(See Drums—Wire Packaging)

PAPER—Coil Wrapping
Ludlow Papers, Needham Heights, Mass.

PAPER—Insulating
Ludlow Papers, Needham Heights, Mass.
Plymouth Cordage Company, Plymkraft Division, Plymouth, Mass.
Twitchell, Inc., E. W., Philadelphia, Pa.

PAY-OUT SYSTEMS—
(See MACHINERY—Take-Up & Pay-Out)

PHOSPHATE COATING CHEMICALS
(See COMPOUNDS—Phosphate Coating)

PICKLING COMPOUNDS—
See (Inhibitors—Pickling)

PLASTICIZERS—
Cary Chemicals, Inc., New Brunswick, N. J.
Monsanto Chemical Company, Plastics Division, Springfield, Mass.

PLASTICS—for Wire Insulation
Blane Corporation, The, Canton, Mass.
Cary Chemicals, Inc., New Brunswick, N. J.
Escambia Chemical Corporation, New York, N. Y.
Monsanto Chemical Company, Plastics Division, Springfield, Mass.
Union Carbide Plastics Company, Div. of Union Carbide Corporation, New York, N. Y.
Union Carbide Corporation, Silicones Division, New York, N. Y.
U. S. Industrial Chemicals Company, Division of National Distillers & Chemical Corporation, New York, N. Y.
United States Rubber Company, Naugatuck, Chemical Division, Naugatuck, Conn.

PRINTING WHEELS—for Electric Wire
Daniels & Co., Frank, New York, N. Y.
Entwistle Manufacturing Corporation, Providence, R. I.
Gem Gravure Co., Inc., West Hanover, Mass.
Gillies, Duncan M. Co., Inc., West Boylston, Mass.

PULLERS AND GRIPS—for Wire
Morgan Construction Co., Worcester, Mass.
Scudder, E. J. Fdry. & Mach. Co., Trenton, N. J.
Sjogren Tool and Machine Co., Auburn, Mass.
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, Ohio

RACKS—Wire Storage
Jarke Manufacturing Co., Chicago, Illinois

REEL AND TENSION STANDS—
Acrometal Products, Inc., Minneapolis, Minn.
Mettler Machine Tool, Inc., New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Mill Supply Co., Pawtucket, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Wardell Braiding Machine Co., Central Falls, R. I.
Watson Machine Co., Paterson, N. J.

REEL CRUTCHES—
Watson Machine Co., Paterson, N. J.

REELS & SPOOLS—Aluminum Alloy
Acrometal Products, Inc., Minneapolis, Minn.
Hubbard Spool Company Div., Van Norman Industries, Inc., Garrett, Ind.
Wardwell Braiding Machine Co., Central Falls, R. I.

REELS & SPOOLS—Annealing and Stranding
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Company Div., Van Norman Industries, Inc., Garrett, Ind.
Mossberg Pressed Steel Corp., Division of Wanskuck Co., Attleboro, Mass.
Republic Steel Corp., Berger Div., Canton, Ohio

REELS—Metal Bound
Durkee Mfg. Co., Inc., Pine River, Minn.
Hubbard Spool Company Div., Van Norman Industries, Inc., Garrett, Ind.

REELS—Plywood
Hubbard Spool Company Div., Van Norman Industries, Inc., Garrett, Ind.

REELS & SPOOLS—Steel (All Types)
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Clark Manufacturing Co., J. L., Rockford, Illinois
Hubbard Spool Company Div., Van Norman Industries, Inc., Garrett, Ind.
Mossberg Pressed Steel Corp., Division of Wanskuck Co., Attleboro, Mass.
New York Engineering Corp., Yonkers, N. Y.
Republic Steel Corp., Berger Div., Canton, Ohio
Wardwell Braiding Machine Co., Central Falls, R. I.

REELS—Steel, for Rope and Cable
New York Engineering Corp., Yonkers, N. Y.

REELS—Wire Mill
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Bridge Mfg. Co., The, Hazardville, Conn.
Durkee Mfg. Co. Inc., Pine River, Minn.
Hubbard Spool Company Div., Van Norman Industries, Inc., Garrett, Ind.
Molded Fiber Glass Tray Co., Linesville, Pa.
Mossberg Pressed Steel Corp., Division of Wanskuck Co., Attleboro, Mass.
Nelson Co., The, Baltimore, Md.
Republic Steel Corp., Berger Div., Canton, Ohio
Wardwell Braiding Machine Co., Central Falls, R. I.

REELS & SPOOLS—Wood
American Wood Working Co., Montello, Wisc.
Bridge Mfg. Co., The, Hazardville, Conn.
Durkee Mfg. Co., Inc., Pine River, Minn.
Hubbard Spool Company Div., Van Norman Industries, Inc., Garrett, Ind.
Nelson Co., The, Baltimore, Md.

REFRACTIONS—High Temperature
Norton Company, Worcester, Mass.

ROD BAKERS—
(See OVENS—Rod Bakers)

RODS—Stainless Steel
American Steel & Wire Div., United States Steel Corp., Cleveland, Ohio
Marathon Specialty Steels, Inc., New York, N. Y.

RODS—Wire—Non-Ferrous
Platt Bros. & Co., The, Waterbury, Conn.
Scovill Mfg. Co., Waterbury, Conn.

RODS—Steel
American Steel & Wire Div., United States Steel Corp., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Continental Steel Corp., Kokomo, Ind.
Detroit Steel Corporation, Detroit, Mich.
Keystone Steel & Wire Co., Peoria, Ill.
Niederrheinische Huette, A. G., Duisburg, Germany
Pan American Trade Development Corp., New York, N. Y.
Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.

ROPE—Wire
American Chain & Cable Co., Page Steel & Wire Div., Monessen, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Roebling's, John A. Sons, Div., Colorado Fuel & Iron Corp., Trenton, N. J.

RUST PROOF COMPOUNDS—
(See COMPOUNDS—RUST Removing)

RUST REMOVING COMPOUNDS—
(See COMPOUNDS—RUST Preventing)

SATURATION SYSTEMS—
Watson Machine Co., Paterson, N. J.

Wire & Textile Mach'y Inc. (used) Pawtucket, R. I.

SOAPS—Industrial and Wire Drawing
(See COMPOUNDS—Wire Drawing)

SPOOLS—For Retail Sale of Wire
American Wood Working Co., Montello, Wisc.
Clark Manufacturing Co., J. L., Rockford, Illinois

SPOOLS—Plastic
Associated American Winding Machinery, Inc., New York, N. Y.
Hubbard Spool Company Div., Van Norman Industries, Inc., Garrett, Ind.
Molded Fiber Glass Tray Co., Linesville, Pa.
Plastic Mold & Engineering Co., Providence, R. I.
Standard Mill Supply Co., Pawtucket, R. I.

STAMPINGS—Steel
Mossberg Pressed Steel Corp., Division of Wanskuck Co., Attleboro, Mass.

STOCK STORAGE SYSTEMS—
Jarke Manufacturing Co., Chicago, Illinois

STRIP—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Roebling's, John A. Sons Div. Colorado Fuel & Iron Corp., Trenton, N. J.

TANKS—Ceramic, for Galvanizing
Ofenbau Fritz G.m.b.H. & Co. K. G., Hagen, W.-Germany)

TANKS—Compound
Watson Machine Co., Paterson, N. J.

TENSION METERS—for Wire
Boulin Instrument Corporation, Pelham, N. Y.
Muirhead Instruments, Inc., (Addison Electric), New York, N. Y.
Tensitron, Inc., Harvard, Mass.

TESTERS—INSULATION
(See Testing Equipment—for Dielectric Faults)

TESTING EQUIPMENT—Dielectric Faults in Insulation
Davis Electric Co., Wallingford, Conn.
Enjaco Corporation, Cranston, R. I.
Entwistle Manufacturing Corporation, Providence, R. I.
Federal Manufacturing Company, Wallingford, Conn.
Muirhead Instruments, Inc., (Addison Electric), New York, N. Y.
Peschel Electronics, Inc., Paterson, N. Y.
Wire & Textile Mach'y Inc (used) Pawtucket, R. I.

TESTING EQUIPMENT—Physical
Scott Testers, Inc., Providence, R. I.

TINSEL—Electric Conductor
A.C.S. Industrial Div., American Copper Sponge Co., Inc., Woonsocket, R. I.
Montgomery Co., The, Windsor Locks, Conn.

TINSEL WIRE—Resistance, Lame, Decorative Cords Thread—Bare Copper Silver and False Gold Coated, etc.
(See TINSEL-Electric Conductor)

TOOLS—Nail Machine
Pittsburgh Carbide Die Co., Monongahela, Pa.

TRAMRAIL SYSTEMS—
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio

TRANSMISSIONS—Variable Speed (See Adjustable Speed Drives)

TRAVERSE & DRUMS—For Reels
(See Drums & Traverses)

TRAVERSE MECHANISMS—
Associated American Winding Machinery, Inc. New York, N. Y.
Davis Electric Co., Wallingford, Conn.
Emory Company, Robert J., Newark, N. J.
New England Butt Co., Division of Wanskuck Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.
Western Wire & Textile Machinery, Inc., So. San Francisco, Calif.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

VARNISHES & LACQUERS—for Electric Wire
General Electric Company, Insulating Materials Section, Schenectady, N. Y.

VULCANIZING PANS AND EQUIPMENT—
American Insulating Mach'y Co., Phila., Pa.
Mossberg Pressed Steel Corp., Division of Wanskuck Co., Attleboro, Mass.

WAXES—for Insulated Wire
Cary Chemicals, Inc., New Brunswick, N. J.

WELDERS—Spot and Butt and Welding Wire Fabrics
Eisler Engineering Corp., Newark, N. J.
EVG, Maschinen and Stahl, A.G., Zurich, Switzerland
Herborn Machinery Corporation, Hackensack, N. J.
Micro Products Co., Chicago, Ill.
Schlatter, Ltd., H. A., Zollikon-Zurich

WHEELS—for Printing on Electric Wire
Daniels & Co., Frank, New York, N. Y.
Gem Gravure Company, West Hanover, Mass.
Gillies, Duncan M., Co., Inc., West Boylston, Mass.

WIRE—Aluminum
Hudson Wire Co., Ossining, N. Y.
Malin & Co., The, Cleveland, Ohio

WIRE—Ball
Marathon Specialty Steels, Inc., N. Y., N. Y.
Webb Wire Div. Carpenter Steel Co., New Brunswick, N. J.

WIRE—Barbed
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.

WIRE—Brake Lining
Hudson Wire Co., Ossining, N. Y.

WIRE—Brass and Bronze
Malin & Co., The, Cleveland, Ohio
Wisconsin Wire Works, Appleton, Wis.

WIRE—Brush
Hudson Wire Co., Ossining, N. Y.

WIRE—Cadmium
Stamford Processing Co., Peekskill, N. Y.

WIRE—Cold Heading
American Steel & Wire Div., United States Steel Corp., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Continental Steel Corp., Kokomo, Ind.
Detroit Steel Corporation, Detroit, Mich.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Jones & Laughlin Steel Corp., Stainless and Strip Div., Detroit, Mich.
Keystone Steel & Wire Co., Peoria, Ill.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Copper
Hudson Wire Co., Ossining, N. Y.
Malin & Co., The, Cleveland, Ohio

WIRE—Flat
American Chain & Cable Co., Page Steel & Wire Div., Monessen, Pa.
Jones & Laughlin Steel Corp., Stainless and Strip Div., Detroit, Mich.
Montgomery Co., The, Windsor Lock, Conn.
Webb Wire Div. Carpenter Steel Co., New Brunswick, N. J.
Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Galvanized
American Steel & Wire Div., United States Steel Corp., Cleveland, Ohio
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Detroit Steel Corporation, Detroit, Mich.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Pan American Trade Development Corp., New York, N. Y.
Roebling's, John A. Sons Div., Colorado Fuel & Iron Corp., Trenton, N. J.
Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—High Carbon
American Chain & Cable Co., Page Steel & Wire Div., Monessen, Pa.
Detroit Steel Corporation, Detroit, Mich.
Webb Wire Div., Carpenter Steel Co., New Brunswick, N. J.

WIRE—Manufacturers
American Chain & Cable Co., Page Steel & Wire Div., Monessen, Pa.
American Steel & Wire Div., United States Steel Corp., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel and Iron Coroporation, Pacific Coast Division, Oakland, Calif.
Continental Steel Corp., Kokomo, Ind.
Detroit Steel Corporation, Detroit, Mich.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Jones & Laughlin Steel Corp., Stainless and Strip Div., Detroit, Mich.
Keystone Steel & Wire Co., Peoria, Ill.
Marathon Specialty Steels, Inc., N. Y., N. Y.
Republic Steel Corp., Berger Div., Canton, Ohio
Roebling's, John A. Sons Div., Colorado Fuel & Iron Corp., Trenton, N. J.
U. S. Steel Corp., N. Y., N. Y.
Webb Wire Div., Carpenter Steel Co., New Brunswick, N. J.
Wickwire Brothers, Inc., Cortland, N. Y.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Metalizing
American Chain & Cable Co., Page Steel & Wire Div., Monessen, Pa.
Hudson Wire Co., Ossining, N. Y.
Platt Bros. & Co., The, Waterbury, Conn.
Stamford Processing Co., Peekskill, N. Y.

WIRE—Music
Malin & Co., The, Cleveland, Ohio

WIRE—Needle
Marathon Specialty Steels, Inc., New York, N. Y.
Webb Wire Div., Carpenter Steel Co., New Brunswick, N. J.

WIRE—Nickel Alloy
Webb Wire Div., Carpenter Steel Co., New Brunswick, N. J.
Wisconsin Wire Works, Appleton, Wis.

WIRE—Nickel Silver and Phosphor Bronze
Malin & Co., The, Cleveland, Ohio
Wisconsin Wire Works, Appleton, Wis.

WIRE—Oil Tempered
Detroit Steel Corporation, Detroit, Mich.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Malin & Co., The, Cleveland, Ohio
Pan American Trade Development Corp., New York, N. Y.
Roebling's, John A. Sons Div., Colorado Fuel & Iron Corp., Trenton, N. J.
Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Special Shapes
American Chain & Cable Co., Page Steel & Wire Div., Monessen, Pa.
Continental Steel Corp., Kokomo, Ind.
Jones & Laughlin Steel Corp., Stainless and Strip Div., Detroit, Mich.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Spring
American Chain & Cable Co., Page Steel & Wire Div., Monessen, Pa.
American Steel & Wire Div., United States Steel Corp., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel & Iron Corporation, Pacific Coast Division, Oakland, Calif.
Continental Steel Corp., Kokomo, Ind.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Jones & Laughlin Steel Corp., Stainless and Strip Div., Detroit, Mich.
Keystone Steel & Wire Co., Peoria, Ill.
Pan American Trade Development Corp., New York, N. Y.
Roebling's John A. Sons Div., Colorado Fuel & Iron Corp., Trenton, N. J.
Webb Wire Div., Carpenter Steel Co., New Brunswick, N. J.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.
Wisconsin Wire Works, Appleton, Wis.

WIRE—Stainless Steel
American Chain & Cable Co., Page Steel & Wire Div., Monessen, Pa.
American Steel & Wire Div., United States Steel Corp., Cleveland, Ohio
Jones & Laughlin Steel Corp., Stainless and Strip Div., Detroit, Mich.
Malin & Co., The, Cleveland, Ohio
Marathon Specialty Steels, Inc., New York, N. Y.
Nippon Stainless Steel Wire Mfg. Co., Ltd., Osaka, Japan.
Pan American Trade Development Corp., New York, N. Y.
Webb Wire Div., Carpenter Steel Co., New Brunswick, N. J.
Wisconsin Wire Works, Appleton, Wis.

WIRE—Steel—Also Coppered and Galvanized Steel
American Steel & Wire Div., United States Steel Corp., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel & Iron Corporation, Pacific Coast Division, Oakland, Calif.
Continental Steel Corp., Kokomo, Ind.
Detroit Steel Corporation, Detroit, Mich.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Malin & Co., The, Cleveland, Ohio
Pan American Trade Development Corp., New York, N. Y.
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's, John A. Sons Div., Colorado Fuel & Iron Corp., Trenton, N. J.
U. S. Steel Export Co., New York, N. Y.
Wickwire Brothers, Inc., Cortland, N. Y.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Straightening and Cutting
Colorado Fuel & Iron Corporation, Pacific Coast Division, Oakland, Calif.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Wickwire Brothers, Inc., Cortland, N. Y.
Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.
Wisconsin Wire Works, Appleton, Wis.

WIRE—Stranded & Bunched
Hudson Wire Co., Ossining, N. Y.

WIRE—Upholstery and Mattress
Pan American Trade Development Corp., New York, N. Y.

WIRE—Zinc
Platt Bros. & Co., The, Waterbury, Conn.
Stamford Processing Co., Peekskill, N. Y.

WOOD—for Guide Rolls, Bushings, Wear Parts, etc.
American Wood Working Co., Montello, Wisc.

WRAPPING PAPER—Creped
(See PAPER-Creped Wrapping)

YARN TESTERS—
National Standard Electronics, Inc., New York N. Y.
Scott Testers, Inc., Providence, R. I.

YARNS—Wire Insulating
Chadwick Yarn Company, Pawtucket, R. I.
Synthetic Thread Co., Bethlehem, Pa.

The WATSON MACHINE COMPANY

ESTABLISHED 1845

PATERSON 16, NEW JERSEY, U. S. A.

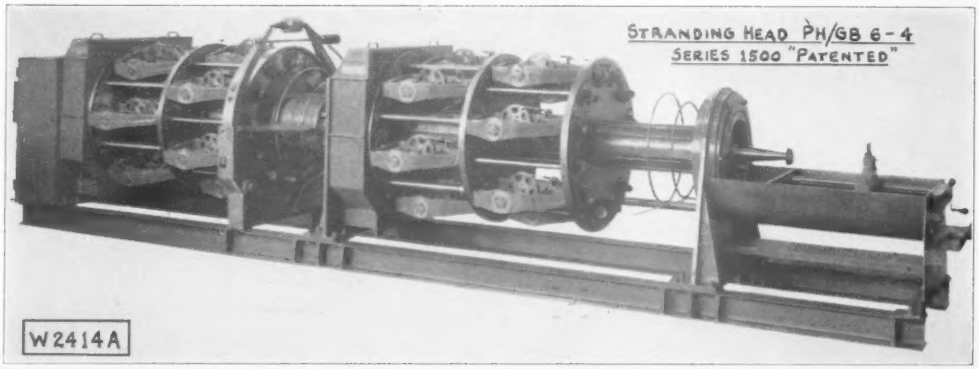
ELECTRICAL WIRE AND CABLE, WIRE ROPE, CORDAGE
AND MASTICATING MACHINERY MANUFACTURERS

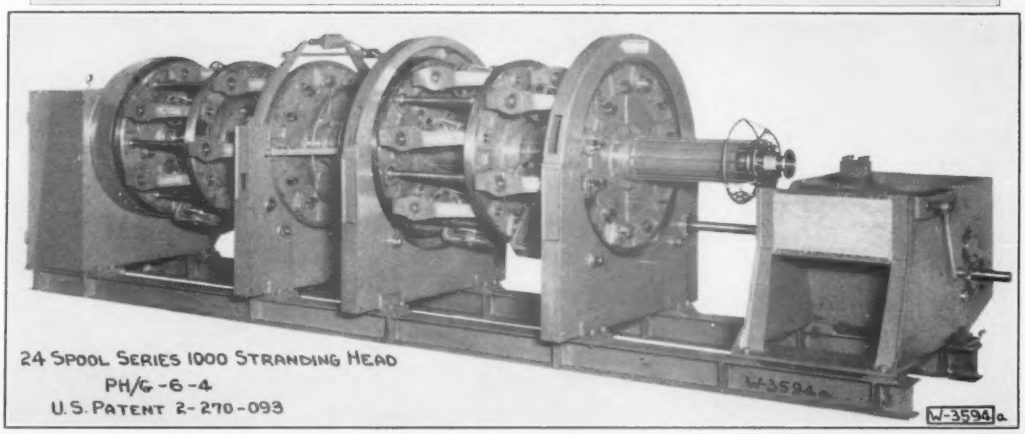
WATSON

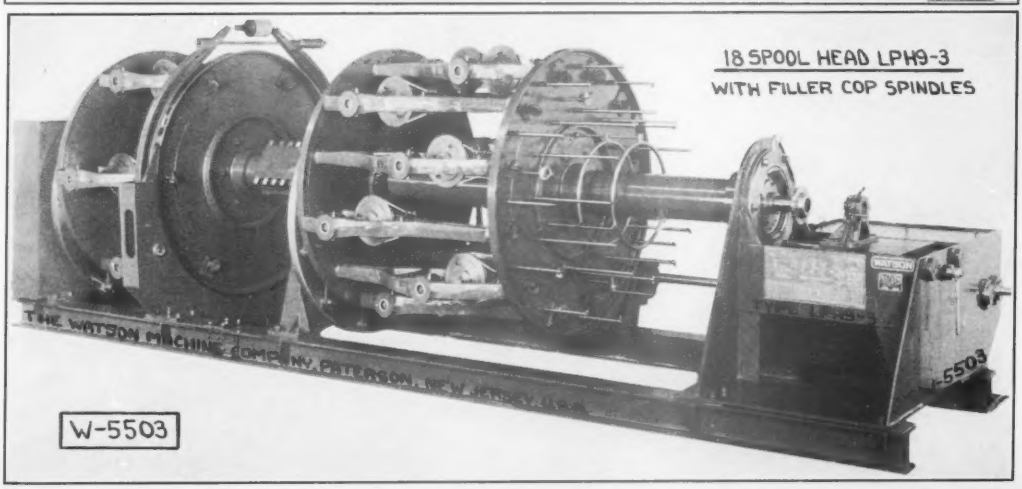
PLANETARY STRANDERS

ALL SIZES AND TYPES, ALL STEEL AND ANTI-FRICTION BEARING. QUICK LOADING. "SHAFTLESS" CRADLES. NO SIDE SLAP. NO LOOSE PARTS. SAFETY SPOOL LOCKS.

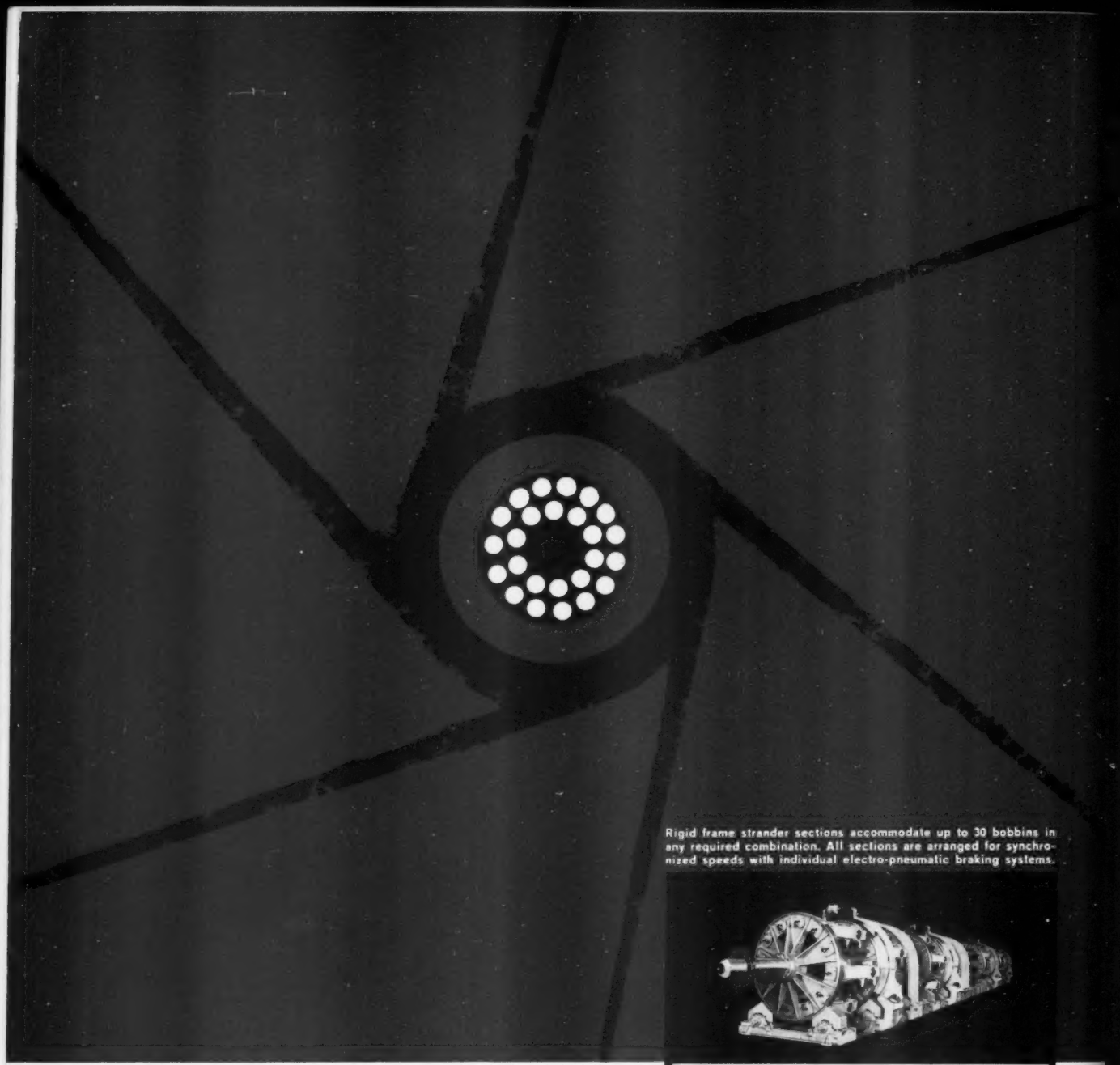
SOLID CRADLES — INTEGRAL FRICTIONS



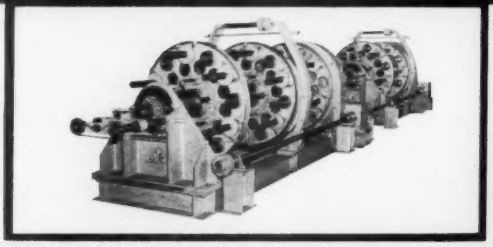




HEADS MOUNTED ON SINGLE HEAVY BASE



Rigid frame strander sections accommodate up to 30 bobbins in any required combination. All sections are arranged for synchronized speeds with individual electro-pneumatic braking systems.



Planetary Strander produces finished rope sizes ranging from ½" to 1¾" dia. and incorporates all elements needed for straight planetary, locked cradle and backturn stranding.

Rigid Frame & Planetary Stranding with Syncro

Whether stranding soft aluminum, copper, or high carbon steel wire look to the Syncro line of skillfully designed and engineered stranding machinery to meet your mill's increasing demands for economical, quality production and greater profits.

For complete information on these stranders and their associated payoff, capstan and take-up equipment, write Syncro Machine Company, Dept. C, Perth Amboy, New Jersey, or 'phone HIIIcrest 2-5500.

Affiliated Company:
Winget-Syncro Ltd.,
Rochester, Kent,
England

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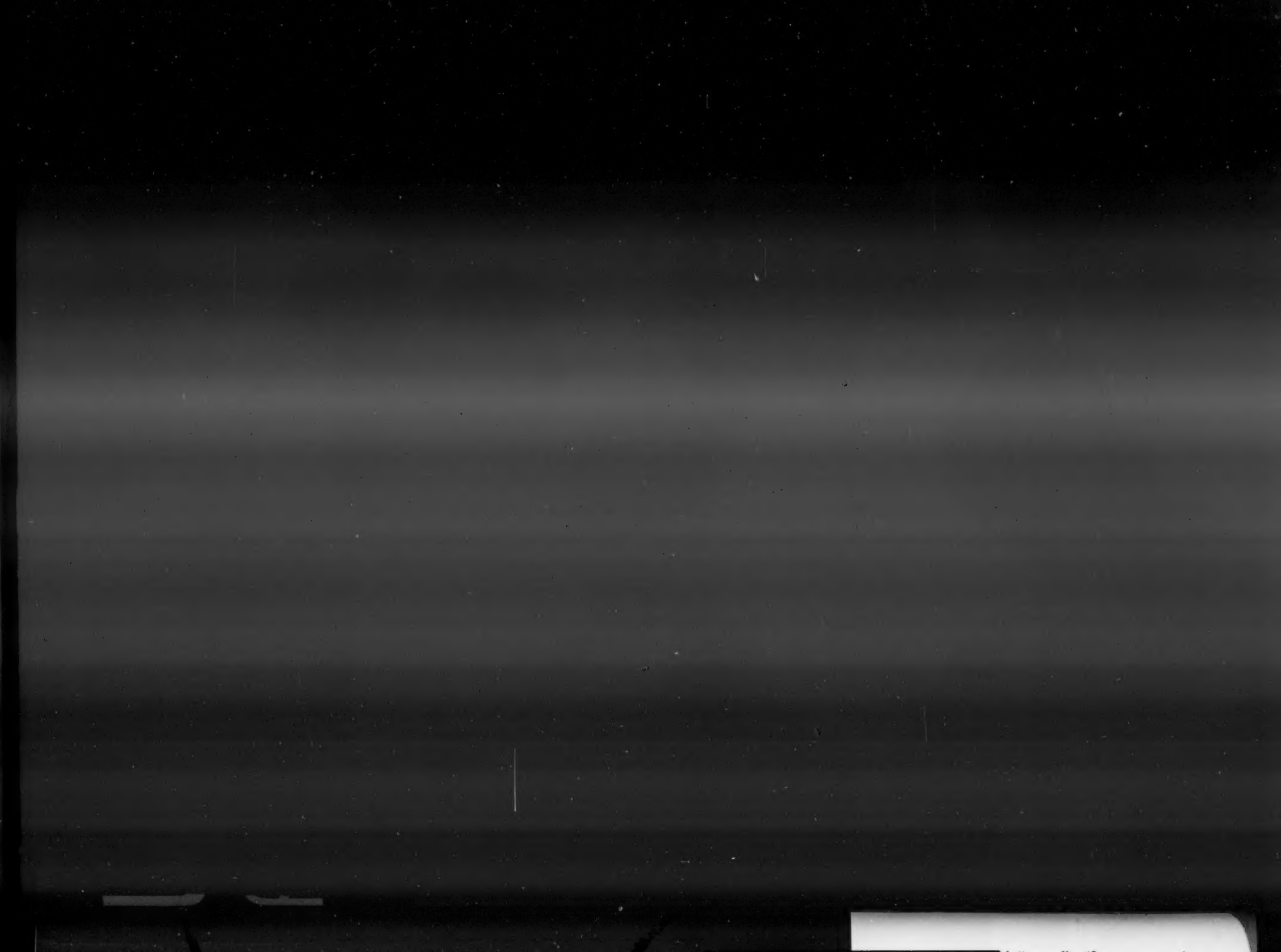
WIRE DRAWING MACHINES • STRANDERS • CONTINUOUS ELECTRIC ANNEALERS • PAYOFFS • CAPSTANS • WIRE INSULATORS • HEAVY DUTY TAKEUPS • TAPERS • SPECIAL MACHINERY